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STATE OF NEW YORK

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COMMISSIONERS

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State Reservation at Saratoga Springs

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TRANSMITTED TO THE LEGISLATURE MARCH 24, 1913

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STATE OF NEW YORK

No. 48.

IN SENATE

MARCH 24, 1913.

Annual Report of the Commissioners of the State Reservation at Saratoga Springs.

To the Honorable the Legislature:

The Commissioners of the State Reservation at Saratoga Springs respectfully make report of their proceedings since the last report, submitted in March, 1912. Following the submission of that report, the Legislature passed a bill appropriating an additional sum of $100,000 for the acquisition of property. After the passage of this bill, conference was had with Governor Dix respecting the necessity of its becoming a law. It was the judgment of the Commission that, in order to "restore and preserve" the natural flowing springs in the town, it was necessary to acquire the property of the Lincoln Spring Company on South Broadway, adjoining that of the Natural Carbonic Gas Company. This was the only company then pumping the waters for the purpose of extracting the carbonic acid gas, and further delay would have been injurious to the interests of the State. The Governor wrote to the Commission, in reply to their definite inquiry as to his position respecting the appropriation of $100,000, "I am heartily in sympathy with the action to acquire the Lincoln property and wish to advise you of my approval of the appropriation to accomplish that purpose." The Lincoln property was then taken to stop the continued depletion of the mineral water basin and thus to con-

plete the restoration of the natural forces which had produced this remarkable carbonated mineral water. The Commission also deemed it necessary to acquire the property formerly known as the Favorite Spring on which are three of the artesian wells. This is a plot on Broadway, opposite the Grand Union Hotel and the property of the Congress Spring Company, the mineral water rights in the latter having already been acquired by the State. Adjoining this old Congress Spring property, which has now been acquired by the village for a public park, are the Congress Hall property and the old Canfield property. These cover two blocks, extending from Broadway to Circular street on the east and from Congress street to Spring street on the north, Putnam street running through and ending at Congress street. It is the present expectation that the Village Park Commissioner will acquire within a short time the Congress Hall property for an extension to the park, in addition to the Canfield property which has already been acquired. This will make the completed park one of the most beautiful small parks to be found and provide the necessary recreation grounds to complete the full and proper use of the mineral waters by seekers after health. When the village shall have acquired this Congress Hall property, it is the purpose of the Commission to acquire the mineral water rights on the remainder of the village park property. This will complete the property now deemed necessary to be owned in order to control the situation and enable steps to be taken to restore as soon as possible the flow of the Congress Spring, perhaps the most famous of all the Saratoga springs.

There are other properties which the full restoration of the underground forces may make it desirable later on for the State to acquire. It is our judgment that, when additional funds shall be available, it will be desirable to acquire for the State the mineral water rights throughout a considerable area adjacent to the fault through which these springs have made their appearance. These mineral water rights have little or no commercial value, but their ownership will enable the State to make suitable plans for the permanent future protection and development of the properties already acquired and thus to further the most effective utilization of this great health-restoring agency of the wonderful Saratoga plateau. The Commissioners have reached agreement during the year with the owners of properties already taken for compensation aggregating a total sum of $150,000, as set forth

in the statement on page 39. This amount, added to the sum of $308,960, noted in the last report, makes the total compensation agreed upon to date $458,960. The values claimed by the owners of the remaining properties taken were in our judgment so excessive as to preclude our making agreement with them as to compensation.

We regret extremely that there has been no adjudication of any of the claims filed before the Board of Claims for the reason that it is most desirable from our point of view that these settlements should be concluded at the earliest possible date. First, we need to know what remainder of the principal sum may be available for such further acquisitions as it might be found desirable to make. Second, we most earnestly desire to stop the accrual of interest on the principal which runs at six per cent per annum until payment is made. We call attention to the fact that, owing to great delay in the delivery of satisfactory titles, the amount of the accrued interest already charged against the principal sum of the appropriation has swollen to a large aggregate. At this date the amount actually paid out by the Comptroller for interest accrued on the agreed value of the properties for which payment has been made aggregates $29,342.82. This interest item was not contemplated by the Legislature at the time of the passage of the act, nor was it calculated by the Commissioners in their estimates. It will be necessary that the Legislature shall at some time make an appropriation to cover money paid out for interest and expenses. The State has saved the interest prior to the date of the issue of the bonds and has also received interest on the balance in the bank of the cash proceeds of the bonds. The State's system of administering its finances, however, does not credit this interest to the Reservation. It is proper, therefore, to request of the Legislature the appropriation again this year of the sum of $100,000, which was included in the supply bill of last year for the purchase of property by the Commission, but which was stricken out by the Governor because, as we understand, the cash was not actually needed to be drawn during that year.

The lease of the Magnetic Spring bath house was renewed with the same party after the Commission had agreed to make expenditures for certain necessary improvements. The lessee reports an increase of every thirty per cent in the number of baths given, and the rental to the State, being one-half of the net receipts, was $458.92. The Commission arranged to supply the Saratoga Spa baths with

mineral water from the overflow of the Hathorn No. 1 Spring at a nominal rental of $100 in order to introduce the waters to that constituency. The lease to Hathorn & Company of the rights to bottle and sell mineral water was continued, providing that they should furnish at the expense of the State the free public service required. For the period to October 1, 1911, the lessee made a considerable loss which, under the terms of the lease, was borne entirely by Hathorn & Company. For the year ending October 1, 1912, the receipts just about equalled the expenditures, the lessee not feeling warranted in making the outlay for advertising under a lease terminable on ninety days' notice, the Commission not feeling justified in making the lease terminable on a longer notice. The Commissioners were relieved to think that the lessee has suffered only a small loss. It is necessary, of course, that the lessee shall carry a quantity of stock on hand so that orders may be promptly filled. These orders are always heavy immediately after the winter season, as shipment during the cold weather is hazardous. It is therefore desirable that there should now be bottled a considerable quantity to accumulate stock to take care of the probable increase in orders this spring as the news is more widely spread respecting the quality of Saratoga mineral waters supplied by the State Reservation. It is of very great importance that the stock on hand shall be owned by or subject to the control of the State. The Commission, therefore, request that a special and separate appropriation of $10,000 be made now to enable them to pay for a sufficient stock of waters or the bottling thereof to make possible prompt attention to orders as received.

The Commissioners have restricted expenditures to the small appropriation asked for and the amount of their receipts for rentals and materials, of which receipts $7,500 has been made available during this present session of the Legislature, because they felt that they ought to err on the side of parsimony until the success of the work done in "restoring to their natural state and purity and preserving the said springs and wells and the natural flow of waters and gases therefrom" should have been demonstrated. The present result and the knowledge acquired through the engineers justify the emphatic statement now that the restoration of the mineral waters to the Saratoga basin has been accomplished. The supply is abundant and the waters vary more widely than ever before in mineral contents as may be seen by reference to the

accompanying tabulated statement of analyses. The time has come, therefore, when the State should make these waters fully available to all and appropriate sufficient funds to attain this end without delay. We have not had funds with which to put into suitable condition for State property the lands, adjacent to the springs, acquired for their protection and development. The Geyser Park, as set forth in the last report, is a unique tract of plateau, ravine, and valley, two hundred and fifty acres in extent. The roads and paths already constructed have been rather primitive and built with strict economy for moderate use. The use of these roads already made indicates that during the coming season there will be much greater wear and tear from automobiles. They should now be put in such condition as to enable them to stand this increased wear and tear. There is fortunately a gravel bed on the Geyser Park property which will enable this road work to be done at a very moderate cost. It is also desirable that we should now remove the unsightly structures which the gas pumping companies constructed. We trust that the greater portion of the important engineering work in progress will be completed during the year, but it is of first importance that it be pushed in certain directions with great energy and without delay. That portion of the artesian well bores extending from the ground downward to the rock has an outer casing of iron, through which is inserted a smaller iron pipe with seals attached reaching far into the rock; and through this inner tubing the waters emerge. There is rapid deterioration of the iron, so that the springs need retubing regularly. This is a source of expense which must be met; but, until a proper utilization of the waters shall be made through a permanent lease or other manner of advertising their qualities, it will be a loss rather than a means to a profit. The Congress Spring bores are a case immediately in point; they need to be thoroughly explored and properly retubed. This work, which will require a considerable expense, should be undertaken at an early date. There is now available much definite knowledge respecting the condition of the springs, the many natural influences which cause mineral springs to flow, and also the influences which affect the flow of the springs and the quality of the water. It is doubtless a fact that no similar fund of scientific knowledge has ever before been accumulated. This is so because seldom has there been any such riot of selfish desire to get everything at no matter what the cost to one's neighbor. The Commission have no hesitation in saying

that it would not have been possible to have brought about the restoration of these mineral waters except by unified ownership, and their preservation is undoubtedly to be secured only through its continuance. We therefore report to your honorable body that it seems beyond question that the action taken by the State was absolutely necessary and that it is already fully justified.

The State is now confronted with the question of what may be the most suitable methods for the fullest development and utilization of these great natural health-restoring waters. In Europe such springs have for a long period of time been mainly owned by governments and in many cases they have been operated directly by government agencies. In some cases they have been leased to parties properly equipped to wisely and effectively exploit them to the advantage of the community and to the profit of the State as well as the lessees. The right determination of which method should be followed by the State of New York, or whether both methods should be utilized, is a question of large and permanent importance. It will not be possible to make satisfactory leases except for long terms, and the proper presentation of the facts concerning the reservation and its waters and the preparation of suitable requirements and regulations to safeguard the State in such leases will require expert study. When plans shall be formulated, suitable and somewhat considerable expenditure for properly advertising the facilities and terms to be offered to lessees must be made. The members of this Commission serve without compensation; and, while they have given freely of their time, energy, and means to the work, it will be quite impossible for them to undertake directly the detailed study and investigation necessary to adopt a permanent plan of utilization. The Commission should, therefore, have available a reasonable sum of money to cover such expense as may be found necessary in developing the facts and properly presenting them. Such expert study may well lead to the conclusion that the State would in the long run be in a better position to see that these exceptional facilities for the restoration of health were made available for the great majority of citizens whose means are limited by itself providing the bathing facilities necessary to insure low prices for the many. At the same time private enterprise might be depended upon to provide luxurious accommodations for those who wished them. The Commissioners regret the delay in reaching conclusions respecting these questions; but, until the waters were restored and the State

was assured of a constant supply of a sufficient quantity of the waters, the necessary facts could not be presented to experts for study and report. All that was possible has been done, and on a strictly economical basis, to utilize the present moderate bathing facilities; but the total aggregate capacity of the two bathing establishments now supplied with State waters, which is about sixty-six baths per hour, will be inadequate to meet the demand during the approaching season.

It is absolutely necessary for the proper utilization of the valuable investment made by the State that the Legislature should now appropriate the sum of $50,000 to cover the various expenses indicated above, which are more particularly set forth in the items of the budget submitted to the Comptroller. A less sum of money will certainly prevent the State from properly dealing with these important questions, and may delay the utilization of this important means for the recuperation of health. There seems every reason to believe that the properties acquired for this Reservation will, in due time and that not too distant, prove financially most profitable.

The Commission submit herewith a detailed report by the engineer, Mr. Edwards, who has been from the beginning in charge of the work and who has proven to be in many respects the ideal man for the place. They feel themselves most fortunate and really under obligation to one so highminded and so thoroughly fitted for this work. The Commission state that it would have been well nigh impossible for them to accomplish the work done or to have effectively carried through the duties imposed upon them had they not been able to secure as their counsel one who has been available at every turn and had much knowledge respecting every aspect of their work, the Hon. Charles C. Lester, who previous to his appointment by this Commission had voluntarily given his services to the Citizens' Committee of Saratoga Springs and thus had the facts in hand. They deem it most suitable that they should now make this record of their sense of personal obligation for his real part in the success which they feel the State has attained in this project. We wish also to express our sense of appreciation of the constant co-operation of the Park Commissioner of the village of Saratoga Springs, the Hon. W. W. Allerdice, and of his successor recently appointed, the Hon. Harry Crocker. The Commission also make record of their obligation for the constant courtesy and most efficient cooperation of the Commissioner

of the Department of Health and his able staff of chemists. The Commission also record their high appreciation of the continual courtesy and the encouraging co-operation of Governor Dix who showed a deep interest at all times in the furtherance of their work. Governor Sulzer has been a lifelong friend of and believer in Saratoga Springs, and he has promptly extended his cordial sympathy and assistance to the Commission.

GEORGE FOSTER PEABODY,
FRANK N. GODFREY,
BENJAMIN F. TRACY,
Commissioners.

SARATOGA SPRINGS, *February* 19, 1913.

To the Commissioners of the State Reservation at Saratoga Springs:

Gentlemen.— In this first formal report of the engineer's work, it is necessary to treat the period covered in the report of the Commissioners transmitted to the Legislature March 7, 1912, as well as the interval which has since elapsed.

Scientific Observations, Tests and Experiments Begun.

Our corps of engineers was organized about July 1, 1911, almost coincident with the acquisition by the State of the properties of two of the largest gas companies, namely, the Natural Carbonic Gas and the General Carbonic companies, and we immediately commenced to make such observations as should enable the Commission to secure data concerning the nature and condition of the Saratoga mineral water basin. We began to apply tests and to take measurements necessary for properly determining not only the effect of the pumping and the occurrences following its cessation, as indicated by wells and springs on or near the tracts occupied by the gas companies, but also the possible influence of this excessive draft of mineral water and gas upon the wells and springs located at a considerable distance, as are the Hathorn, the Congress, and others in the heart of the village, two miles from the Geyser district.

Careful records of these observations taken at frequent intervals were systematically entered in field-books and afterward plotted in the form of diagrams. These observations include the water levels in such wells as were not being pumped at the time of observing, both on the properties of the gas companies and also throughout the entire extent of the reservation, also the amount of flow of both water and gas from natural flowing springs and the gas pressures, also the amount of water extracted from each well pumped by the gas companies, also the gas output of single pumped wells as recorded by meters, also the total gas output of individual gas companies, also the variations in temperature and pressure of the gas, also the levels of upper ground waters as indicated by a system of driven wells extending from the Geyser Park to Congress Park. Chemical analyses of the various mineral waters, made by the State Department of Health, include complete analyses and frequent regular tests showing the amount of chlorine as sodium chloride and

of the alkalinity in terms of calcium carbonate in the various waters. These latter tests were graphically represented for purposes of comparison, as were also the measurements of the daily and monthly rainfall. For these latter records the Commission is indebted to the Saratoga Street, Water and Sewer Commission. Considerable effort has been made to secure other information of value from well drillers, from the records of the gas companies, from former private owners, and from residents of Saratoga, showing the depths of strata passed through in the boring of widely distributed wells, their depth to bottom, length of tubing, depth of seals, date of drilling, etc.

Historical, Descriptive and Explanatory Matter.

The experiments and observations outlined in this report will be more readily comprehended if the important historical and scientific facts concerning Saratoga's mineral waters are rightly understood. I therefore make brief recital of these points, many of which have been covered in previous reports and documents, but others of which are now published for the first time.

The original nature fountains of Saratoga were found in the valley extending generally north and south throughout the heart of the village, this valley being the seat of a notable geological fault, the mineral water bearing limestone being so displaced as to permit the water and gas to force their way through the deposit of drift and issue forth at the surface of the ground without artificial aid. It should be noted also that, when the supply from these springs failed, or became unsatisfactory from dilution or contamination by surface water, the private owners of the same generally resorted to the practice of drilling artificial wells deep into the rock and the work of developing spouting springs was begun. The first well of this kind which suggested the idea of boring artesian wells for mineral water was the original Geyser Spring, drilled in 1870, with the intention of securing a supply of fresh water but which unexpectedly produced mineral water, and it and others drilled subsequently spouted to a great height. The carbonic acid gas industry was then established. Many more wells were thereupon drilled which showed remarkable energy of water and gas, much of which was dissipated, resulting in an enormous loss before it became possible to harness the wells and to collect the commercially valuable output. When nature had

expended a considerable amount of energy through these spouters, the owners of these wells, in order to maintain their gas output, resorted at first to gas lifts and then to the use of deep well pumps and thus made even more excessive drafts upon the mineral water basin, the water being pumped from the ground, the gas extracted, and the water wasted.

Character of Strata Underlying the Reservation.

In succeeding paragraphs will be found a brief description of the nature and depth of strata underlying the territory covered by the reservation, as reported to us by drillers of wells and owners of mineral water properties interrogated on the subject.

In the High Rock district, the escarpment of the fault showing the displacement of the rock with the superimposed drift on the east and the exposed limestone cliff about 35 feet high on the west, can be seen by every visitor. Northward we find, at the New Red Spring, rock was reached at a depth of 60 feet, and at the Old Red Spring at a depth of 22 feet, whereas at a greater distance to the south we note that at the Hathorn Spring in the village the limestone rock is buried under about 65 feet of drift, while at the old Congress Spring a deposit of about 18 feet of gravel covers the limestone. About a mile still further south, on the tract of the Natural Carbonic Gas Company in the Lincoln district on South Broadway, the top of the limestone is at a depth of 168 feet in the northwest portion of the tract, and a mixture of shale and limestone is reached at a depth of 183 feet in the southern part of the tract near the Lincoln Spring property and limestone at a depth of 258 feet on this same spot, overlying the mixture of shale and limestone is a layer of shale rock about 40 feet thick, above which is a somewhat porous layer of dark gray sand and gravel, varying from a few feet to 24 feet in thickness, and above this porous layer a stratum of clay varying from 31 to 50 feet in thickness, over which lies a layer of quicksand covered with soil principally of common sand. At the Lincoln Spring we find the arrangement of strata quite similar to that underlying the Natural Company's tract, but at different depths, limestone being reached at a depth of 271 feet from the surface of the ground, a mixture of shale and limestone at a depth of 221 feet covered by shale which extends to a point 146 feet beneath the surface, the porous layer of dark gray sand and gravel which

covers the shale lies 95 feet beneath the surface and is covered by a stratum of clay 20 feet thick, and from this point upward extends a thickness of 75 feet of quicksand, soil, and common sand. On the property of the Chief Spring Company adjoining occurs a quite similar arrangement of strata but at varying depths. About a mile further south in Geyser Park where the valley of Coesa Creek widens out and where the old New York and Geyser Gas companies, later consolidated into the General Carbonic Company, were operating, the limestone is found at a depth of 275 feet, covered with a layer of shale rock about 200 feet thick, and this covered with a layer of clay generally from 40 to 60 feet thick, and this in turn buried beneath a deposit of about 15 feet of gravel, although the strata of clay and gravel are in places very thin. In this district at the Geyser Spring in a single artesian boring, shale rock is found 9 feet below the floor level of the building and forms a stratum 80 feet thick covering the limestone. Three-fifths of a mile further south, at the spring known as the Hathorn No. 2, the southernmost property included in the reservation, which is about three and one-half miles north of the Artesian Lithia Spring at Ballston Spa, the limestone is at a depth of 455 feet, shale rock with a slight admixture of limestone from a depth of 75 feet down to the 455-foot level, shale rock from a point 23 feet beneath the surface to the 75-foot level, and on top of the shale rock a thin layer of gravel covered with a thicker layer of blue clay, the latter extending nearly to the surface of the ground.

Summary of Surface Elevations.

A general idea of the relative surface elevations of the territory embraced can be gained from the following brief summary:

The elevation of the Hathorn No. 1 Spring floor, which is in the valley at the center of the village, is approximately 276 feet above sea level, the present top of casing of old Congress Spring in Congress Park is 270 feet, the elevation of the floor of the Emperor pavilion in High Rock Park is 267 feet, the average elevation of the ground on the South Broadway tracts is about 316 feet, and the wells in Coesa Valley show elevations of tops of casings ranging from 245 feet in the case of the Champion No. 2 to 228 feet for Shonts No. 3, with an average elevation of 238 feet. It

will be seen that these elevations show an extreme variation of 88 feet.

Naturally Flowing Springs.

The Hathorn No. 1 Spring began to flow again soon after the cessation of the pumping of the waters for drinking and bathing at the Patterson and Levengston springs, though the mineral water levels in the South Broadway tracts were then much below the Hathorn overflow, and there were still lower levels at the Geysers. At the time of beginning our observations the following springs were furnishing mineral water as a natural flow: In the village, the Hathorn No. 1, the Peerless, the Magnetic, and the Old Red Spring; in the Geyser group, two miles south of the village, the Hathorn No. 2, the Hathorn No. 3, the Coesa (formerly Carlsbad No. 3), the Adams, the Champion No. 2 and Champion No. 3, the latter two furnishing a very large flow of water weak in mineralization.

Pumping by the General Carbonic Company Stopped.

On the General Carbonic Company tract in the Geyser district, it was found that 25 bores were in existence, of which 19 varied in depth from 270 feet to 533 feet to the bottom of well. The Lafayette Company's property adjoining contained three additional bores, one of which had been filled and another of which the General Carbonic Company had pumped under lease. There were then one flowing well, two so-called dry gas wells, and six wells being pumped on the General Company's property. Our records of these observations began on July 2, 1911, and from that date to July 20, 1911, the General Company maintained an average of six pumps working continuously, pumping from wells ranging from 316 feet to 397 feet in depth, an average of about 120,000 gallons of water per day of twenty-four hours. While this pumping was in progress certain other wells in the immediate vicinity of the pumped wells showed a depth of water surface below the top of well casings of 150 to 170 feet. On July 20, 1911, the Commission stopped all pumping by the General Carbonic Company. At once there was a marked rise in water levels throughout this tract. The graphs showing the changes in water levels approximated the form of parabolic curves which by their nature showed that the cessation of pumping

tended to produce naturally flowing springs. In twenty-four days one of the wells formerly pumped, namely, the Hathorn Purchase No. 1 (on our records as Pump Well No. 4) had become a spring giving forth excellent mineral water at the rate of several gallons per minute, while others showed a rise in water levels of from 130 to 150 feet. On the forty-ninth day after the stoppage of pumping, Ditch Well No. 2, a surface well, that is one not penetrating the rock, being only 45 feet to bottom and which had been abandoned, was yielding mineral water. In sixty days a second pumped well, the Hathorn Purchase No. 2 (our Pump Well No. 5) was spouting. The Champion springs showed greatly increased flows at this time. In three months after the stoppage of pumping, Flat Well No. 3, and, four months after its cessation, Flat Well No. 2 showed small flows of mineral water. At this latter time the Island well also began to overflow with mineral water for the first time in its history. During the pumping by the General Carbonic Company this well had been a large producer of so-called dry gas, the water in the same being kept at a low level by the pumping of adjacent wells, although this well was never pumped during our observations. However, two days after the pumps were stopped the Island well meter showed that the well had ceased to yield gas, the rising water having sealed the gas vein.

PUMPING BY THE NATURAL CARBONIC GAS COMPANY STOPPED.

On the property of the Natural Carbonic Gas Company in the Lincoln district on South Broadway were found 38 bores, 16 of which ranged in depth from 165 feet to 332 feet to bottom, and 22 of which ranged in depth from 142 feet to 106 feet. The latter 22, probably not entering the shale rock, might be classed as shallow wells. It was observed that a large proportion of the output of gas subsequently obtained at this plant was derived as dry gas from the so-called shallow wells, the pumping of the deep wells operating to keep the mineral water levels down, although separators extracted most of the gas from the water pumped from the deep wells. Thus, by lowering the mineral water level in shallow wells which were generally so constructed as to just penetrate the dark gray sand and gravel immediately over the shale rock and underlying the clay, a natural separator was in continuous operation, the excess of carbonic acid gas from

the mineral water in the rock rising and accumulating in this stratum. The almost impervious stratum of clay therefore served the double purpose of separating the upper ground waters from the mineral waters and of acting as a lid to this immense natural gas retort. From July 1, 1911, when the careful measurements and records of our Commission were begun, to October 21, 1911, the Natural Carbonic Company was operating an average of 14 pumps continuously, extracting mineral water from the wells at the rate of about 230,000 gallons per day. On the latter date this company was pumping 16 wells, 12 deep and 4 shallow wells, and on this same day the pumping of the 12 deep wells was stopped, special care being taken to note every change caused by the stoppage of such pumping. Almost instantly there was a marked rise of mineral water levels over the entire tract, one of the pumped wells rising fifty-six feet in forty-five minutes. In ten days the water levels of these pumped wells which had varied greatly at the time of shutting down the pumps had reached about a uniform height, and in spite of the continued pumping of the four shallow wells the gas produced was only about one-third of what it had been when the deep well pumps were also being operated, and the output of gas had become almost negligible in amount by November 6, when the four shallow well pumps were stopped. The shallow wells had previously yielded about 40 per cent. of the total gas output. One of these four shallow wells alone had yielded nearly one-third of the entire output during the maximum pumping, and the rise of the mineral water soon sealed all flow of gas from this as well as from all the other dry gas wells.

Pumping on the Lohnas and Lincoln Tracts Stopped.

We found seven wells, operated by the Lincoln Spring Company, upon the Lohnas tract adjoining the property of that company on the south. Of these the wells known as the Hayden and Hodges West were deep wells, 255 feet and 306 feet deep respectively, the other five being shallow wells ranging from 98 feet to 114 feet in depth, three of which were producing so-called dry gas, not being pumped, and two of which were being pumped. The Lincoln tract contained twenty-six bores, five of them deep wells varying in depth from 242 feet to 426 feet to bottom, the latter depth being that of the well known as the Lincoln Spring,

and twenty-one shallow wells varying in depth from 88 feet to 119 feet to bottom. On April 13, 1912, the pumping of the five wells found in operation on the Lincoln tract was stopped. The rate of rise of ground waters in this and the neighboring tracts was again promptly accelerated. On May 1, 1912, the water levels as indicated by forty-two wells distributed over the South Broadway district, showed practically a common level sixty-nine feet below the surface of the ground. This water level is still rising, and on January 1, 1913, the average mineral water level of this entire tract was still forty-five feet below the surface of the ground, but only five feet below the level of the floor of the Hathorn Spring building in the village. A condition approximating stable equilibrium of forces which tended to produce changes in water levels and flows of wells and springs in Coesa Valley as a result of the stoppage of pumping in that vicinity, had been reached some time previous to January 1, 1912. Later on, as the water in the South Broadway wells rose after the cessation of pumping in the Lincoln district, it attained a greater height above sea level than these openings in the Geyser district, and a new increment of rise was observed in the wells throughout Coesa Valley. As one important result the wells formerly pumped, which had never flowed, now burst forth as natural spouting springs. This produced so great a waste of mineral water that in order to conserve, and thus to "restore and preserve" the springs, it became necessary to check the flow from these openings.

Recovery of Mineral Waters in the Village.

The close underground connection of all these mineral water springs is made clear by noting the relation of the records as above shown in the gas pumping districts to the simultaneous changes in the case of wells and springs in the village hereinafter outlined.

It was shown in the report of the Commission transmitted to the Legislature, May 9, 1911, that in March of that year, "the water level in the Hathorn (No. 1) Spring was below the overflow," which was a point nearly nine feet below the floor level. When the engineers began their observations in July, 1911, this spring was flowing freely in the bowl, the bottom of which rested slightly above the floor level of the building. This result followed the stoppage of the local pumping and the retubing of

the spring under the direction of the Commission after the State acquired the property. The spring has continued to improve both as to constancy and quantity of flow and also as to mineralization, and is now yielding a continuous flow of from eight to ten quarts of mineral water per minute, the top of the bowl being nearly three feet higher than the floor level, or about twelve feet higher than the point at which it had formerly failed to flow.*

The surplus water from this spring is carried by gravity to a storage tank beneath the floor level, and from this point it is forced by a pump through a pipe line to a tank in the Saratoga Bath House on Phila street, the Commission having arranged to supply the water for the mineral baths.

The Emperor Spring in High Rock Park began to show signs of recovery of mineral water energy very soon after the first cessation of pumping. In July, 1911, the water stood below the level of the top of casing, about four feet below the floor level of the pavilion, beginning to trickle over the top of casing about August 1, 1911. A small opening then made near the top of casing permitted the flow to continue and on March 27, 1912, this had increased in amount to a gallon a minute and the water had shown a gradual increase in degree of mineralization. It was, therefore, decided to retube this spring, to thoroughly clean the bore, and to so arrange the seals as to include the best vein of mineral water. When this had been completed on April 16, 1912, we secured the present splendid flowing spring, only a short distance from the original site of the High Rock Spring, the first spring to be discovered in this valley. It is believed by many to be without question the same vein which supplied High Rock Spring, to which the Indians brought Sir William Johnson in 1767. This water is strong in gas, of a fair degree of mineralization, and spouts to a convenient height above the floor level. Arrangements were at once made to serve the water for drinking purposes, and a connection was made with a storage tank at the Magnetic Bath House which added an important increase to the supply of mineral water available for baths.

The New Red Spring has been flowing more freely and at a higher level. The wooden tubing of the Old Red Spring being

*March 1, 1913: The Hathorn No. 1 Spring is flowing in two bowls. The top of one bowl which is over the "old fountain" in the center of the pavilion, is more than four feet above the floor level, and the flow of mineral water in this bowl is at the rate of three quarts per minute. The flow in the second bowl, the top of which is nearly three feet above the floor level, averages five and one-half quarts per minute.

neither sanitary nor permanent in character, in July, 1912, it was decided to retube this spring, and, to avoid a very expensive and difficult piece of excavation, a plan had to be devised whereby the spring coming up through a large hopper-shaped intake from a layer of grayish white clay, might be confined in the largest possible sanitary tube which could be passed through the old wooden tube. The course of the spring having been once started through the smaller intake, an eight-inch steel casing, by a special treatment of the clay, the space between the old and new tubes was then packed with gravel and grouted. After retubing, the flow was slightly greater than before, and bacteriological examination showed the water to be again pure.

The following properties have not been acquired by the State, but their owners have very courteously allowed us to keep a record of the fluctuations of these springs, and they are, therefore, noted herewith.

The Wagman Spring, owned by the proprietor of Elmwood Hall and situated just south of High Rock Park, is not a flowing spring, but water is extracted from the same by means of a hand-pump and served to the hotel guests. Chemical analyses of the water have shown a remarkable increase in mineralization, and the proprietor reports that a much greater flow is now obtained than was formerly the case as a result of the same amount of energy spent in pumping.

The Pavilion and United States springs have also shown improvement both as to quantity of flow and degree of mineralization. The flow is from nipples inserted in the old wooden tubes.

The well at Dr. Strong's sanitarium is said to be 414 feet deep, the rock being reached at a depth of eighty-six feet. Its water levels rose about eight feet from December 22, 1911, to June 29, 1912. Shortly afterward Dr. Strong had the spring tubed, and by passing down gas from a cylinder under a high pressure for a few moments he has succeeded in starting a flow of mineral water for a short period of time, thus enabling him to secure a sufficient amount to furnish mineral water baths at the sanitarium.

On the Nolan property situated on the high plateau of Whitney place, just southeast of Congress Park, are two bores, one of which, a shallow well seventy-four feet deep, had yielded dry gas, and the other, a deep well 225 feet in depth, contained mineral water which did not rise to the surface of the ground. An arrangement had been installed by the owner by which the gas from the dry

gas well was piped to a point below the water level in the mineral water well, thus exerting a gas lift and causing the water to flow above the ground. It was noted that the gas pressure as recorded by a gauge on the dry gas well was from ten to eleven pounds from November 9, 1911, to December 21, 1911, and increased to seventeen pounds by January 31, 1912, and remained at seventeen and one-half pounds from March 20 to May 2, 1912, when it became fifteen pounds and remained at nearly this amount until July 13, 1912, thereafter decreasing rapidly until August 24, 1912, when it registered only a pound or two. The gas lift could no longer be employed in raising the mineral water, the gas having been sealed by the rising water. On August 27, 1912, the water level in both the gas well and mineral water well was about forty feet beneath the surface, and by January 3, 1913, this had risen to a point thirty-five feet down. It is interesting to note that this water level coincides almost exactly with that in the Congress Spring and in several others of the village mineral springs not flowing, and is also only a few feet below the average level in the wells in the Lincoln district on South Broadway.

The Washington Spring is the property of St. Peter's Catholic Church. It is located on Broadway opposite the Congress Spring Park. This spring was formerly famous as a chalybeate water. It has never flowed during the period covered by our observations. The water levels have been taken since October 2, 1911, and no permanent changes in these had been discernible before November 15, 1911. Since the latter date the mineral water levels have shown a slow, but steady, movement upward, and on January 3, 1913, the water stood ten feet below the floor of the pavilion, having risen nearly seventeen feet since November 15, 1911. The owners have pumped only a limited amount of this water to distribute to applicants during the summer season. Chemical analyses of the water covering a considerable period of time have been made under the direction of the Commission.

The Columbian Spring was acquired by the State with the mineral rights of Congress Spring Park. This is also a chalybeate water, it being evidently closely connected with the Washington Spring, like changes in water levels being recorded simultaneously in the case of these two springs. The total depth to bottom of the Columbian Spring at present is eleven feet, and it might more properly be termed a well as it has never been definitely known to overflow, the water rising in a square wooden tube with

hopper-shaped bottom, packed with clay to the rock through the crevices in which the waters pour forth. From the time of beginning observations on the Columbian in July, 1911, to the spring of 1912, the tube had been dry to the bottom, but on April 13, 1912, a depth of about six inches of water was observed, and the water gradually rose until on January 3, 1913, it stood less than four feet below the top of tubing, which point is said by old residents to have been its normal level. In October, 1912, the dead surface water was pumped from the tube and a sample of the mineral water showed that it possessed a relatively fair degree of mineralization. It is proposed to make the radical changes necessary in the tubing early in the coming season, because of the totally unsanitary conditions of the present wooden tube, after which the water should be in condition to be served to the public.

The Congress Spring in Congress Spring Park, perhaps the most famous of Saratoga's mineral springs, had shown a rise of about one foot in water level on April 26, 1912, when it was decided to retube this spring. Before doing so, after extracting the old tubing, a careful exploration of the three-inch diamond-drilled bore was made from the top to the present bottom in order to determine at what point the best mineral water vein was to be found. The seals were so placed and the tubing so lowered as to permit us to secure samples of the water from all parts of the bore, the water being extracted from the same by means of a hand-pump. These samples, having been chemically analyzed, the tubing was again extracted and the seals so set as to include the present best mineral water vein. The water continued to stand at practically the same level in the tubing as before, and on October 26, 1912, the bore was again explored and the seals renewed. The water level at the present time, January 25, 1913, is thirty inches higher than it was in July, 1911, and as this is an elevation considerably above that of the bottom of the present pit, it seems reasonable to assume that a flowing spring can be established here as soon as the necessary construction work has been completed which will make the pit water-tight and thus prevent the village water courses in times of heavy storm from flooding the Congress Spring. The Congress bore is said to have been drilled to a depth of 317 feet, and some years ago several lengths of pipe with seals and a fishing-tool were lost in it and are at present jammed into the three-inch hole obstructing the same at a point

255 feet below the top of casing. It has been reported to the Commission that the best mineral water vein is below the 255-foot depth, but opinions derived from various sources concerning this matter differ greatly; it will be necessary to investigate thoroughly, early next season, not only this bore and the two other bores in Congress Park and that under the Congress bottling house, but also the three Ainsworth bores on the property across Broadway, known as the Favorite Spring, owned by the State, as all of these wells seem to be closely connected. I consider this of the first importance, and the expense may be a considerable item, but the work should not be delayed.

There has been a general rise in practically all the other village wells, but such changes have necessarily been less marked in this locality than at points nearer to the seat of the excessive pumping.

Scientific Tests and Experiments.

Perhaps one of the most important questions to be determined was the underground connection between the various wells and springs, especially as regards those separated by a considerable distance. The former owner of the Levengston Spring, which does not flow naturally, requested permission to pump this spring in order to determine the effect of such pumping on the neighboring springs. Two tests were made during April and May, 1912, during the first one the Levengston being pumped three gallons per minute and eight hours per day for a period of fourteen days, and during the second test it was pumped nine gallons per minute and eight hours per day for a period of seven days. During the first test the Hathorn No. 1 Spring dropped in flow three-fourths of a quart per minute between early morning and late afternoon reading on several occasions, and during the second test a daily decrease between morning and afternoon readings of from three-fourths of a quart to one and three-fourths quarts was generally noted, the flow in the bowl being very weak, half the time not sufficient to cause the water to flow over the top of the bowl. The total flow per minute of the Hathorn No. 1 on the last day of the second test and during the hours of pumping, was only about 75 per cent. of what it had averaged for fifteen days before the experiment was tried. The Hathorn No. 1 Spring failed to flow in the bowl for a short time on two occasions during the second test. The Levengston generally showed a lower water level at

the close of each day than that recorded in the morning, the greatest difference being about three feet. During the first test the Patterson Spring ceased to flow in from two to six minutes after the Levengston pump was started each day, and began to flow again on one occasion twenty-two minutes after the Levengston pump was stopped for the day, and during the second test the flow of the Patterson ceased almost simultaneously with the starting of the Levengston pump, and it had not begun to flow again on one occasion fifty-four minutes after the Levengston pump had been stopped for the day. The mineralization of the Hathorn No. 1 was not appreciably affected during the tests.

In order to further determine the effect of the local pumping, later in the month of May, 1912, the Patterson Spring was pumped at the rate of nearly seven gallons per minute for seven days of eight hours each. During this test the flow of the Hathorn No. 1 showed a decrease, varying from one and one-fourth to two and three-fourths quarts per minute between morning and afternoon readings, and the water ceased to flow over the top of the bowl on one occasion, and also showed slight variations in mineralization during the progress of the experiment. The water level of the Levengston Spring, which under normal conditions had remained almost constant, dropped from five and three-tenths feet to five and five-tenths feet each day between early morning and late afternoon readings.

The excessive flow of mineral water from the Champion No. 2 and Champion No. 3 springs in Geyser Park made it seem probable that experiments with that flow would throw more light on this question as to the extent of the underground connections. It was, therefore, decided to stop the flow of the Champion No. 2 and Champion No. 3 by lengthening their casings to such a height above the ground as to allow the water to rise in the same instead of escaping, and thus eventually seal off the flow. In September, 1911, it was found that by so doing the water levels of many wells in the immediate vicinity were raised from eight to ten feet in ten days' time, and that the gas content in the water from the nearby Adams Spring, which had been about 1,200 pounds per day, was reduced to two-thirds of its natural flow in the same period of time. The Champion springs were allowed to flow again at the end of a period of twenty-two days, the water levels above referred to dropping back to their former readings and the gas output of the Adams quickly returning to the normal amount.

On May 23 and 24, 1912, the flows of the Champions No. 2 and No. 3 were again stopped by carrying up water columns in the above described manner, and such conditions maintained until October 31, 1912. In ten days' time, several of the neighboring wells, which had in the former test shown a rise of water levels of from eight to ten feet, now showed an average rise of thirteen feet and continued to rise. Among the wells so affected was the old Geyser Spring, while the Geyser North and the Geyser East soon began to flow as a result. The gas output of the Adams Spring was again reduced in thirty days to about two-thirds of its former amount, and remained at about that quantity during the experiment. From October 31, 1912, to November 6, 1912, the Champions No. 2 and No. 3 were again allowed to flow and showed a total flow of nearly 160 gallons of water per minute as compared with the total flow of about sixty gallons per minute shortly after the stoppage of pumping by the General Carbonic Company in July, 1911. The wells whose water levels had been raised now generally showed a drop of from eleven to sixteen feet, recovering their former levels, however, soon after the water columns were again carried up on the Champions No. 2 and No. 3, but no appreciable effect was noticed on this occasion in the case of the old Geyser Spring, which, as will be explained later, had been spouting continuously since June 19, 1912. Besides the effects noted above in the case of neighboring wells, the water levels of a number of wells on the South Broadway tracts a mile away were observed to be lowered from eighteen inches to five feet, and several of the village wells two miles away also showed a drop in water levels while the Champion springs were flowing, and both the South Broadway and village wells showed a return to their former levels soon after the flow of the Champion springs was stopped.

Geyser Spring Spouting.

The spring known as the Geyser under the old nut and bolt factory near Geyser pond originally had a strong flow, and special attention was given to this bore in order to restore the flow if possible. It was found upon careful investigation that the bore was very crooked and irregular and was filled to a considerable depth with foreign material. It was, therefore, reamed to a uniform size, cleaned and explored from top to bottom, in order to

locate the best mineral water vein, and afterward tubed. It then being noted that the water in the tube had been rising, due to the water columns on the Champion Springs and other measures of conservation, we were soon able to secure an excellent spring spouting to a height of several feet above the floor level. The flow of a gallon a minute has continued without interruption from the time the work was completed in June, 1912. Early in July, 1912, a glass dome was placed over the spring, exhibiting the same as a natural spouter, and the water was served to the public. This was the first time that the celebrated Geyser Spring had been known to flow for many years.

Flows of Several Spouters in the Geyser District.

It has already been stated that several spouting springs in the Geyser district were developed by the stoppage of the pumping in that locality. On July 16, 1912, Pump Well No. 4 (Hathorn Purchase No. 1) flowed 11 gallons of mineral water per minute, and Pump Well No. 5 (Hathorn Purchase No. 2) flowed 7 gallons per minute. The Island Spring flowed 8 gallons per minute, while the Flat Well No. 2 and Flat Well No. 3 were each flowing a small amount. The Adams Spring still maintained a flow of 10 gallons per minute, and it was thought best to carry up water columns upon all the great producers of mineral water or otherwise check their flow, not only to completely carry out the idea of conservation, but also to determine the relation between these and other valuable wells and springs. Upon so doing new energy appeared in the Flat Well No. 2, which was retubed and spouted at times to a height of nearly forty feet and showed a static pressure of forty-two pounds, so that it became necessary to put a valve upon the outlet and conserve this valuable energy of water and gas. A number of wells not appreciably affected during the progress of these experiments were packed to the bottom with impervious material to prevent the loss of gas as well as to exclude fresh water from the mineral water veins; while those exhibiting signs of life were carefully tubed and tested, and in this way additional valuable spouting springs, including the Shonts No. 2 and No. 3, were developed. The latter two springs have, however, been temporarily plugged so as to conserve mineral water and gas.

Bottling of New Reservation Waters.

In the fall of 1912, the experiment of bottling a limited amount of the waters from several of the flowing springs on the Reservation was carried out, utilizing for such purpose the bottling plant acquired from the Lincoln Spring Company, the waters being transported to that point in glass vessels. Waters from the following springs were so bottled and are now being tested: The Geyser, Pump Well No. 4, Flat Well No. 2, the Island and the New Red.

Radium and Thorium Tests.

During the summer of 1912, without expense to this Department other than that of collecting and shipping samples, tests for radium and thorium in the various flowing springs throughout the Reservation were begun under the direction of Professor R. B. Moore, a noted specialist of the United States Department of the Interior, Bureau of Mines. Samples of the waters, gases and residues of the several springs were tested. A final report covering the results of these tests is to be forwarded to the Commission.

Improvements at Bathing Establishments.

The old Red Spring bathhouse was demolished in the spring of 1912, the building being quite dilapitated and not in condition to arrange for suitably giving baths. The supply of mineral water was totally inadequate to meet any fair demand for baths without resorting to pumping, the natural flow still being limited to only a few quarts per minute.

At the Magnetic Spring bathhouse in the High Rock Park district the demand for baths had so increased that, in the spring of 1912, it was deemed necessary to make a careful study of the available sources of naturally flowing mineral water in that locality, and, as has been explained before, a pipe-line was laid by which the surplus water from the Emperor Spring was conducted under the street to augment the supply from the Peerless and Magnetic Springs at the bathhouse. The tanks formerly used to collect the overflows of the Peerless and Magnetic Springs were of wood and in a very bad condition, and it became necessary to remove the same. Three reinforced concrete tanks were constructed with an aggregate capacity of several thousand gallons,

to which the waters of the three mentioned springs are conducted by gravity and from which the mineral water may be pumped to the bathhouse as occasion demands. The peculiar drainage conditions in that locality made the construction work difficult and rather expensive. The bathhouse was thoroughly renovated and painted in the spring, and in order that the length of the season might be extended so as to afford a greater use of the baths, a heating plant was installed in the early fall and the bathhouse was kept open to December 1, 1912.

The lessee of the Saratoga Spa baths requested the Commission to furnish the surplus water from the Hathorn No. 1 Spring for use there. This request was granted, and a short lease was made in order to supply the baths with this water. A reinforced concrete tank was constructed in the spring of 1912 below the floor level of the Hathorn building to which the water flows by gravity. A pumping plant and pipe-line were installed, and the water is now forced to a storage tank in the attic of the bathhouse. The use of the Hathorn No. 1 water for bathing purposes enables the Saratoga Spa baths to supply mineral water baths throughout the year.

Other Improvements, Construction and Repairs.

In the fall of 1912, drains from both the Old and New Red Springs were laid to the deep sewer in that locality, in an endeavor to perfect the sanitary conditions at these springs.

A comfort station near the Reservation trolley stop between the Hathorn No. 2 and Coesa Springs was completed and opened to the public in September, 1912.

A pumping plant and pipe-line for delivering pure water for washing bottles at the Hathorn No. 2 and Coesa Springs were installed in the fall of 1912. The water is pumped from a well, filtered, and lifted to storage tanks at the bottling plants of these springs.

Springs Retubed by Former Owners.

The former owners of the Patterson Spring, having petitioned the Commission to be allowed to retube this spring, the mineral rights of which had been acquired by the State, the petition was granted, and on June 25, 1912, the work was begun. Since retubing, the flow of the spring has somewhat increased, averaging

at the present time five quarts per minute. The analysis of the water shows it to be weak in mineralization.

Mrs. Amy A. Clark, the former owner, petitioned to be permitted to retube the Clark No. 1 and Clark No. 2 Springs on land acquired by the State in Coesa Valley in the Geyser district. This petition was granted by the Commission. Since the work of retubing was completed, Clark No. 1 Spring has shown, at very irregular intervals, a small flow of water rather low in mineralization, and Clark No. 2 Spring has become a flowing spring furnishing from two to three and four-tenths gallons of water per minute, the larger flow being given off at times when the Clark No. 1 has ceased to flow. The water from the Clark No. 2 Spring now shows a fair degree of mineralization.

Public Service of the Waters.

The free service of the water at the various pavilions has been greatly improved during the past season, special attention being given to sanitation, both as to the springs themselves and also as to the vessels used for drinking purposes. At the Hathorn Spring in the village, a strictly modern and thoroughly sanitary piece of apparatus for washing glasses was installed, and at some of the springs individual cups were obtainable from a slot machine.

The service of mineral water at the Hathorn No. 1 Spring has been maintained throughout the year, and at several other springs, including the Emperor, Old Red, New Red, Geyser, Coesa, Hathorn No. 2 and Hathorn No. 3, the length of the season has been greatly extended. The Peerless water is being served each day between certain hours throughout the winter season, the New Red Spring is accessible to the public at all times, and persons desiring the water from any particular spring which has been closed for the winter, may have vessels filled at the spring at certain hours by making application at the Reservation office.

Development of Geyser Park.

The Geyser Park contains 250 acres of plateau, ravine, and valley, beautifully forested, with the picturesque Coesa creek flowing through for a mile. Here the springs first showed signs of full recovery of mineral water and gas, and the park now abounds in flowing springs which vary greatly in degree of mineralization from a mild table water to the most powerful medicinal water

which has ever been found in Saratoga. It was decided to open up this beautiful natural park to the public. The valley surrounding Coesa creek, a beautiful stream now rushing on in small torrents, now placidly winding and turning in every conceivable manner in the flat country, is richly endowed by nature with a diversity of landscape effects, and is forested with a great variety of both coniferous and deciduous trees, some of the finest timber in this part of the State. This valley with its beautiful water course, fed by springs terminating in brooks of crystal-like clearness and passing through lands varying greatly in contour from a decidedly rolling, almost rugged country to a broad flat expanse, furnishes unusual opportunities for development into a notable park, one of the greatest assets of a successful watering place. At a comparatively small expense this locality can be made very attractive, but thus far, while keeping in mind a general broad scheme providing for a greater degree of perfection as conditions justify the expenditure, we have limited our efforts to the construction of two miles of earth roads, the slight improvement of old roads, the opening up of a few paths and trails to the various springs, and the building of rustic bridges, fences, and arches. With the very limited appropriation, only a small portion of the same was available for the purpose of park development, but the results secured with this small outlay have been highly satisfactory.

Respectfully submitted,

FREDERICK EDWARDS,
Engineer for the Commission.

Saratoga Springs, *February* 1, 1913.

To the Commissioners of the State Reservation at Saratoga Springs:

GENTLEMEN.— In order to understand definitely certain features of the mineral water basin and thus be enabled to conserve and use to best advantage the mineral water and gas contained therein, an accurate knowledge of the nature and depth of strata underlying the Reservation and adjoining territories is absolutely necessary. To obtain this invaluable information, an underground survey should be made under the direction of the State Geologist, the Hon. John M. Clarke. Such survey should include the making of borings and the taking of other measures to secure the scientific data necessary for the exact location of the entire fault and for the determination of the character and depth of strata in parts of the underground basin concerning which no definite knowledge is now available. This work will probably require considerable time, and I would therefore urge that you impress upon the Governor and Legislature the importance to the State of beginning it at the first possible moment.

Respectfully submitted,

FREDERICK EDWARDS,
Engineer for the Commission.

SARATOGA SPRINGS, *March* 1, 1913.

APPENDIX A.

GENERAL DESCRIPTION OF THE MINERAL WATERS OF SARATOGA SPRINGS.

Mineral waters have been variously classified upon the basis of their mineral contents or their physiological effects. A reasonable classification would seem to be upon the basis of the preponderance of such mineral ingredients as determine a special physiological effect or a particular therapeutic value. On this basis mineral waters have been grouped into five different classes, namely: 1, saline or aperient; 2, alkaline or antacid; 3, ferruginous or chalybeate; 4, sulphurous; 5, potable or indifferent. Saratoga will be found to produce waters of each of these five classes.

Saline or aperient waters. It was waters of this class that first gave Saratoga a reputation as a health resort. Congress Spring, whose waters were first widely known and used both at home and in foreign countries, produced waters of this character. Their therapeutic value has been recognized by prominent physicians for nearly a century. Hathorn No. 1 Spring formerly produced waters similar in their character to those of Congress Spring but more highly mineralized and possessing more powerful cathartic properties. Among the springs upon the State Reservation many properly belong to this class and are of varying degrees of strength, from waters carrying nearly 3,000 parts per million of bicarbonate of magnesia, such as are produced by Hathorn No. 2 Spring, to waters carrying from 800 to 900 parts per million of the same salt, such as the waters of the Emperor and Peerless Springs.

Alkaline or antacid waters. Saratoga has at different times had various springs belonging to this class. The only one now active upon the reservation is the Geyser. This spring has received very careful treatment by the Commissioners. The crooked and uneven bore, the product of early methods and rude appliances, has been carefully reamed out and straightened and the seals and tubes have been renewed. The waters can now be secured without suffering dilution or contamination from contact with the atmosphere. The well has a sufficiently copious flow to produce an output equal to that of the French Vichy.

Ferruginous or chalybeate waters. The old Columbian, Washington and Hamilton Springs and the other springs that produced chalybeate waters of established value were among the first to fail after the pumping of the gas wells began. The Columbian, which is now the property of the State and within the reservation, has already attained a water level that is little if any below the normal, while a new well, whose waters had never been used for drinking nor even subjected to chemical analysis, but which was drilled by one of the gas companies for the gas it might yield, has been found to produce a chalybeate water containing 45.62 grains of ferrous bicarbonate to the gallon. This places it at the head of all natural chalybeate waters in point of strength. It is hoped that the old chalybeate springs will exhibit further signs of revival before another summer season arrives.

Sulphurous waters. There are no sulphurous waters on the reservation, but in the vicinity of Saratoga are mineral springs of this character whose waters can easily, and at moderate expense, be brought to some convenient point in the village.

Potable waters. Saratoga is built in part upon a plateau, which is a natural reservoir of ground waters of excellent quality, at the edges of which these waters flow in springs that do not fail in the most prolonged periods of drouth. The ground waters in this plateau stand at a level of from 20 to 30 feet above the adjacent water courses and are believed by some engineers to furnish the hydrostatic head for both the fresh water and mineral water springs. The fresh water springs furnish an abundant supply of potable waters, and, under certain conditions, they dilute the mineral waters that flow to the surface. This dilution is no doubt what produces springs containing the same mineral constitutents and in much the same proportions but of varying degrees of strength; and it produces a copious supply of waters containing sufficient mineral salts and carbonic acid gas to make them palatable, but not enough to produce a purgative effect. These waters have been freely used as potable waters and have acquired well deserved reputations as such, though it may be that they will be found, upon longer use and more careful study, to produce alterative effects that should be reckoned with in using them.

The waters of Saratoga are all of about the mean annual temperature, varying only slightly with the changes of the seasons. No thermal springs are found here.

The waters of Saratoga were used for the treatment of diseases

for an unknown period by the Indians, and by white men at least from the time when Sir William Johnson was brought to the High Rock Spring in 1767. More than a century ago, Dr. Valentine Seaman of New York City wrote a treatise upon these waters dealing with their mineral constituents and their value as medicinal remedies; and since then many similar treatises have been written, all of which attribute to the waters great efficacy as remedial agents.

When taken internally, the waters of the different springs are doubtless capable of producing widely different physiological effects and nearly all of them contain a considerable amount of common salt and an excess of carbonic acid gas which adapt them to use for the treatments given at Homburg and Bad Nauheim. The flow of the springs is sufficient to enable thousands of baths to be given daily; and the great excess of carbonic acid gas which accompanies the waters might be used to carbonate other waters, if desired, or perhaps be utilized as an article of commerce.

MEDICINAL USE OF THE MINERAL WATERS OF SARATOGA SPRINGS.

The stronger saline cathartic waters of Saratoga Springs have long had a reputation as medicinal remedies. Before the middle of the last century the waters of Congress Spring were exported to foreign countries and widely known and used. The chalybeate waters which were less satisfactorily bottled were for that reason less widely known, but many persons came under the advice of their physicians to drink them here. The alkaline waters were also used as remedies to a considerable extent but were more largely used as table or potable waters and frequently, to meet the demands of the trade, were highly carbonated. For a considerable time prior to the formation of the State Reservation, however, on account of the great decline in the strength of the waters of many springs, due to the unnatural draught upon the mineral water supply, and the uncertainty as to their mineral contents, the demand for these waters decreased. Since then the measures of conservation adopted having proved efficient and recent analyses by the State Department of Health having removed doubts as to the mineral contents, their use is again increasing.

The waters of the Old Red Spring were first used considerably for local bathing and early achieved a reputation for efficacy in the treatment of skin diseases. Later, a bath house was estab-

lished at the Magnetic Spring and the waters were used and reputed as efficacious for the treatment of rheumatic and gouty affections. Since the establishment of the reservation, the use of these baths has largely increased and they have been put in better order. The demand for baths is, perhaps, the most notable sign of the development of Saratoga Springs toward a successful modern health resort.

The tenant in occupation of the Magnetic Spring baths during the season of 1912 gave one-third more baths than the previous season. He reports the receipt of an increasing number of requests for literature concerning the baths; that physicians are showing more and more interest in them; and that a greater number of patients are coming for treatment under the direction of their medical advisers. He says:

"A greater number of patients came this year with specific prescriptions from local physicians. This increase was about threefold more than in 1911. All patients coming without prescriptions, especially those with marked infirmities and those past middle life, have been urged to seek medical advice before taking the baths. This has been heeded in a great many instances. Of the total number, about one-third came with prescriptions."

He also reports that the demand for baths was frequently quite up to the capacity of the establishment and recommends an increase of facilities to accommodate the still greater demand which will, without doubt, be made in 1913. The tenant, who is himself a physician, states in reference to the therapeutic value of these baths:

"My personal experience has been that rheumatism per se, neuritis, and nervous disorders in general have been benefited. These benefits have certainly been genuine and not imaginary. Cases with ankylosed joints, rigid muscles, and the many complications and sequelae of these diseases, by the use of the baths, followed by massage, and even without the latter, have been greatly improved, and in the milder cases at least symptomatically cured. Cases coming under my observation that were treated in 1911 remained cured, but returned in 1912 to take another course as a preventative measure. * * *

"Several cases of markedly high blood pressure from arteriosclerosis, and cardiac as well as renal diseases were much improved, not only temporarily but the good results continued as long as I was able to keep them under observation. * * *

"A greater capacity, as well as more modern and commodious accommodations, are to my mind imperatively needed before the coming season."

Another bath house, built some years ago but which had been principally devoted to fresh water baths and Turkish baths, came under a new management last year and special arrangements were made there for giving mineral water baths. The Commissioners of the State Reservation furnished this establishment with an adequate supply of mineral water. It began business on the first of June, 1912, and began at once to give a considerable number of mineral water baths — practically all of them under prescriptions of physicians. This establishment also gave a new sort of baths, devised by a prominent physician, and which it called carbonic cardio-corrective baths, of which the proprietor says:

"This bath was opened to the public for the first time in America on July 18th, and has hardly been given a thorough test, but already it has a growing reputation locally and in the surrounding cities. Several New York physicians have personally observed its action and have indorsed it. Our records show very satisfactory results. The present management of the Saratoga Mineral Baths realized the peculiar conditions obtaining in Saratoga which made these baths possible and only possible in this reservation and are greatly pleased with their experiment."

The same establishment gives Russian, Turkish and Hydrodynamic baths, which it is stated are well patronized and most of which were given pursuant to orders of physicians.

ANALYSES OF MINERAL WATERS AT SARATOGA SPRINGS, N. Y.

TABLE 1.—THE RESULTS OF THE ANALYSES ARE EXPRESSED IN MILLIGRAMS PER LITER.

Chemical combinations.	Old Red.	New Red.	Magnetic.	Emperor.	Peerless.	Hathorn No. 1.	Hathorn No. 2.	Hathorn No. 3.	Coesa.	Geyser.	Adams.	Pump well No. 4.	Flat well No. 2.	Ditch well No. 2.	Island.
Ammonium chlorid	6.74	10.23	8.27	11.77	11.22	17.85	59.93	48.70	35.83	39.40	31.12	8.54	57.13	6.48	33.82
Lithium chlorid	8.19	8.53	10.63	24.94	5.20	18.76	81.16	70.82	39.64	16.75	44.87	5.87	31.63	14.27	27.47
Potassium chlorid	60.22	66.66	61.31	198.70	206.33	280.79	963.93	756.30	609.18	246.84	438.01	149.88	508.48	77.50	426.84
Sodium chlorid	307.12	817.85	1,032.31	2,429.03	2,495.83	3,021.17	10,776.34	9,124.69	5,043.53	1,951.08	5,892.90	1,339.84	6,470.17	1,802.89	3,958.48
Magnesium chlorid														182.43	
Potassium bromid	3.50	12.00	7.20	17.00	14.00	16.00	87.75	51.66	29.67	20.00	62.00	10.00	38.50	5.00	24.00
Potassium iodid	0.60	0.40	0.40	0.50	1.12	1.20	3.78	2.10	1.36	1.00	5.50	1.40	1.90	0.40	1.00
Sodium sulphate	7.91	9.46	14.95	4.88	31.67	15.56	5.33	10.04	8.37	19.36	3.40	11.13	4.26	7.91	12.17
Sodium metaborate	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace
Sodium nitrate	trace	trace	trace	0.12	none	trace	trace	trace	trace	trace	0.23	trace	trace	trace	0.24
Sodium nitrite	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace
Sodium bicarbonate	362.63	275.32	281.85	169.83	585.31	1,112.96	562.95	526.32	850.34	2,238.22	869.61	403.44	859.14		572.04
Barium bicarbonate	5.33	5.10	6.62	2.44	5.56	3.59	12.22	34.70	13.56	7.78	19.56	7.11	12.44	2.22	11.33
Strontium bicarbonate	trace	trace	trace	trace	trace	trace	6.40	1.14	2.74	1.14	trace	trace	3.66	none	3.66
Magnesium bicarbonate	324.70	447.42	512.90	884.58	984.13	1,102.92	2,815.78	2,426.67	1,501.22	704.24	1,533.00	505.99	1,499.91	1,008.71	1,221.22
Calcium bicarbonate	768.75	1,141.89	1,090.00	2,069.59	2,141.96	1,887.30	3,918.91	3,504.67	2,786.01	1,728.78	2,713.59	1,419.77	2,786.01	1,531.73	2,372.74
Ferrous bicarbonate	34.14	39.94	50.88	13.61	36.47	40.51	20.48	18.34	25.48	30.08	28.14	16.20	780.11	29.27	22.07
Mangano-manganic oxid	trace	heavy tr.	none	trace	trace	none	trace	none	trace	heavy tr.	none	trace	trace	none	trace
Alumina	26.58	14.02	1.10	10.79	10.61	12.10	19.06	21.77	1.18	4.48	3.30	10.30	132.59	23.72	7.60
Silica	51.75	79.40	50.75	13.95	11.80	11.50	8.70	10.50	8.50	14.80	8.95	9.20	56.55	73.55	10.05
Total solids in solution (computed)	1,968.16	2,928.22	3,129.17	5,851.73	6,541.21	7,542.21	19,348.72	16,608.42	10,956.62	7,023.92	11,654.09	3,898.67	13,242.48	4,766.08	8,704.73
Temperature	11.1°C.	11.6°C.	11.1°C.	10°C.	9.5°C.	10.3°C.	9.5°C.		10°C.	10°C.	10°C.		10.5°C.		11°C.
Date of taking sample	1912 Aug. 14	1912 July 17	1912 Feb. 7	1912 June 19	1912 Jan. 22	1912 May 27	1912 Nov. 27	1913 Feb. 6	1912 Dec. 13	1912 July 3	1912 Mar. 20	1912 July 18	1912 Oct. 9	1912 Sept. 19	1912 Oct. 23

THE WATERS OF ALL THE SPRINGS ARE, AT NORMAL ATMOSPHERIC TEMPERATURE AND PRESSURE, SUPERSATURATED WITH CARBONIC ACID GAS.

ANALYSES OF MINERAL WATERS AT SARATOGA SPRINGS, N. Y.

TABLE 2.— THE RESULTS OF THE ANALYSES ARE EXPRESSED IN GRAINS PER U. S. GALLON.

Chemical combinations.	Old Red.	New Red.	Magnetic.	Emperor.	Peerless.	Hathorn No. 1.	Hathorn No. 2.	Hathorn No. 3.	Coesa.	Geyser.	Adams.	Pump well No. 4.	Flat well No. 2.	Ditch well No. 2.	Island.
Ammonium chlorid	0.40	0 59	0.48	0.69	0 66	1.04	3 50	2.85	2 09	2.30	1.82	0.50	3.34	0.38	1.98
Lithium chlorid	0.48	0.49	0.62	1 46	0.30	1.10	4.74	4 14	2.31	0.98	2.62	0.34	1.85	0.83	1.61
Potassium chlorid	3.52	3.89	3 58	11.62	12.07	16.42	56.72	44.22	35.62	14.43	25 61	8.76	29.74	4 54	24.96
Sodium chlorid	17.96	47.82	60 37	142.05	145.95	176 67	630.19	533 61	294.94	114.09	344.61	78.35	378.37	105 43	231.48
Magnesium chlorid														10.67	
Potassium bromid	0.20	0.70	0.42	0.99	0.82	0.94	5.13	3.02	1.73	1.17	3.64	0.58	2.25	0 39	1.40
Potassium iodid	0.04	0.02	0.02	0.03	0.07	0.07	0.22	0.12	0.08	0.06	0.32	0.08	0.11	0.02	0.06
Sodium sulphate	0.46	0.55	0.88	0.28	1.85	0.91	0.31	0.59	0.49	1.13	0.20	0.65	0.25	0.46	0.71
Sodium metaborate	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace
Sodium nitrate	trace	trace	trace	0.007	none	trace	trace	trace	trace	trace	trace	trace	trace	trace	0.02
Sodium nitrite	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace	trace
Sodium bicarbonate	21.20	16.10	16.48	9.35	34.22	65.08	32.92	30.78	49.72	130.89	56.70	23.59	50.24		33.45
Barium bicarbonate	0.31	0.29	0.39	0.14	0.33	0.21	0.71	2.03	0.79	0.46	1.14	0.41	0.73	0.13	0.66
Strontium bicarbonate	trace	trace	trace	trace	trace	trace	0.37	0 067	0.16	0.07	trace	trace	0.21	none	0.21
Magnesium bicarbonate	18.99	26.16	29.99	51.73	57.55	64.49	164 67	141.91	87.79	41 18	89.65	27.59	87.71	58.99	71.41
Calcium bicarbonate	44.96	66.77	63.74	121.02	125 26	110.37	229.18	204 94	162.92	101.09	158.68	82 44	162.92	89.57	138.71
Ferrous bicarbonate	1.99	2.34	2.97	0.80	2.13	2.37	1.78	1.07	1.49	1.76	1.64	0.95	45.62	1.71	1.29
Mangano-manganic oxid	trace	heavy tr.	none	trace	trace	none	trace	none	trace	heavy tr.	none	trace	trace	none	trace
Alumina	1 55	0.82	0.07	0.63	0.62	0.70	1.11	1.27	0.07	0.26	0.19	0.60	7.75	1.38	0.44
Silica	3.03	4.66	2.97	0.82	0.69	0.67	0.51	0.61	0.50	0.87	0.52	0.53	3.31	4.30	0.59
Total solids in solution (computed)	115.10	171.24	182.99	342.16	382.52	441.06	1,131.50	971.25	640.74	410.75	681.52	227.99	774.41	278.71	509.05
Temperature	52°F.	53°F.	52°F.	50°F.	49.1°F.	50.5°F.	49.1°F.		50°F.	50°F.	50°F.		50 9°F		51.8°F.

ANALYSES MADE BY THE STATE DEPARTMENT OF HEALTH FOR THE COMMISSIONERS OF THE STATE RESERVATION AT SARATOGA SPRINGS.

APPENDIX B.

AGREEMENTS ON COMPENSATION FOR PROPERTIES TAKEN.

At the time of the last report, nineteen agreements had been made and approved, totaling $308,960. Since then two agreements have been made and approved, the total compensation being $150,000, and in addition the sum of $42,783.43 has been paid for incidental expenses of acquisition, legal services in connection therewith, and interest. The balance of Chapter 394, Laws of 1911, available for similar expenses in the future and for payment of compensations not yet agreed upon, is $440,030.34. The two agreements of the past year are:

1. Natural Carbonic Gas Co. This property of 20.78 acres, on which are thirty-eight bores, is located in the Lincoln district on South Broadway. The large plant here situated pumped much more water and secured more gas than that of any other of the gas companies in Saratoga, its pumping operations involving the extraction of over 200,000 gallons of water daily from the ground of this property. This is more than seven times the estimated flow of all the natural springs in Saratoga at the period of their greatest activity. The greatest dissipation of the resources of the Saratoga mineral water basin was stopped by the acquisition of this property. Agreed compensation, $130,000.

2. Champion Natural Carbonic Acid Gas Co. This property consists of two parcels of land, the entire area being 14.9 acres, and contains several different wells, including the old Champion Spring, formerly one of the most spectacular of the spouting springs at Saratoga. One of the first acquisitions made by the Commission was a one-fourth interest in this property, payment for which has already been made. For the remaining three-fourths interest the agreed compensation is $20,000.

Claims have been filed by the owners of the following properties, taken by the State for the Reservation:

1. Clark. Ninety-four hundredths acres of land, with three wells, two having an intermittent flow since recently retubed; also a small abandoned gas plant; and the mineral rights on 3.8 acres adjoining. Amount of claim, $27,960.

2. Lafayette Spring Co. Thirteen and two-tenths acres of land, with one well plugged and two not flowing, besides an abandoned gas plant. Amount of claim, $49,700.

3. Saratoga Victoria Spring Co. One and one-tenth acres of land, with wooden building and one well not flowing. Amount of claim, $50,000.

4. Shonts. Twenty-five acres of land, with one well not flowing, and old barn now removed. Amount of claim, $27,500.

5. Wiswall. Eleven acres of land, with no wells nor buildings. Amount of claim, $16,202.

6. Lohnas. Mineral rights on twenty-five and eleven hundredths acres of land with seven bores. Amount of claim, $200,000.

7. Lincoln Spring. Twenty-four and sixty-two hundredths acres of land, with twenty-five bores and the Lincoln Spring which is not flowing. On the property are a bottling plant, gas pumping outfit, machinery, and buildings. Amount of claim, $559,000.

8. Hathorn. Two properties, one in the village, with wooden building and the Hathorn No. 1 Spring; one at the Geyser Park, with two flowing wells and a wooden bottling house. The State has already paid for a one-tenth interest in the former property. Amount of claim, $515,000.

9. Geyser. Twenty and twelve hundredths acres of land, with four wells, including the old Geyser Spring; also a large brick building. Amount of claim, $150,000.

10. Patterson. Mineral rights on plot of land in the village, including the Patterson Spring. Amount of claim, $105,000.

11. Levengston. Mineral rights on plot of land in the village on which are two bores, one being the Levengston Spring. Amount of claim, $125,000.

For the following properties no claims have been filed, nor have agreements been reached:

1. The mineral rights on the Village Park properties.

2. Favorite Spring. Forty-seven hundredths acres of land with three bores. The temporary and damaged structures on this property have been removed.

3. Dingman. Eighty-nine hundredths acres of land, with dwelling and other buildings. Adjoins the Champion and Victoria Spring properties.

FINANCIAL STATEMENT.

CHAPTER 394, LAWS OF 1911.

Acquisition of Property.

1912.				
Feb	1.	Balance		$860,523 77
	28.	J. S. & C. A. Williamson, for property taken	$2,240 00	
		M. L. Gailor, for property taken	4,000 00	
		M. L. Gailor, interest	198 00	
		C. S. & C. C. Lester, legal services	200 00	
		C. S. & C. C. Lester, legal services	150 00	
March	13.	J. B. Bailey, services as appraiser	200 00	
		Brezee & Mallory, services as appraisers	608 57	
		L. M. Jones, services as appraiser	100 00	
		W. S. Lefler, services as appraiser	230 00	
		W. Lester, services as appraiser	525 90	
April	6.	F. C. Foster, traveling expenses	12 80	
		Hamilton Bank Note Co., engraving plates	4,395 50	
		M. E. Crane, for property taken	2,120 00	
May	1.	M. E. Crane, interest	127 20	
June	10.	Hamilton Bank Note Co., printing bonds	527 50	
		John F. Hennessy, county clerk, fee	1 85	
		George H. West, county clerk, fee	2 50	
		W. S. Robertson, services as appraiser	70 00	
	12.	General Carbonic Co., for property taken	125,000 00	
		General Carbonic Co., interest	6,006 95	
		C. S. & C. C. Lester, legal services	1,405 15	
	18.	General Carbonic Co., interest	1,201 39	
July	11.	Henry McGurk, for property taken	600 00	
		Henry McGurk, interest	44 00	
		Saratoga Seltzer Spring Co., for property taken	22,000 00	
		Saratoga Seltzer Spring Co., interest	1,393 33	
	18.	C. S. & C. C. Lester, legal services	961 80	
	23.	J. A. Bensel, State Engineer, surveys	56 68	
		J. S. Mott & Son, maps	33 44	
Aug.	28.	C. S. & C. C. Lester, legal services	1,764 07	
		John F. Hennessy, county clerk, fee	2 50	
Sept.	21.	Brezee & Mallory, services as appraisers	110 60	
Oct.	8.	Mary E. Gray, for property taken	2,000 00	
		Mary E. Gray, interest	172 33	

1912.				
Nov.	4.	C. S. & C. C. Lester, legal services...	$449 00	
		Yonkers Observer, advertising sale of bonds	78 40	
		Medina Daily Journal, advertising sale of bonds	176 40	
		Investors' Review, advertising sale of bonds	235 20	
		Walter S. Henry, for High Rock Spring property	20,000 00	
		Walter S. Henry, interest	1,853 33	
	13.	John F. Hennessy, county clerk, fees.	10 75	
Dec.	2.	Star Spring Co., for property taken..	30,000 00	
		Star Spring Co., interest	2,920 00	
		James H. Boyce, for property taken..	3,250 00	
		James H. Boyce, interest	309 29	
		C. S. & C. C. Lester, legal services...	871 50	
	4.	C. S. & C. C. Lester, legal services..	674 75	
	9.	Corliss Sheldon and J. A. T. Schwarte, executor of Eliza C. S. Grant and Amelia A. Grant, for Magnetic and Peerless spring properties	12,000 00	
		Corliss Sheldon and J. A. T. Schwarte, executors, interest	1,182 00	
		C. S. & C. C. Lester, legal services...	325 00	
	21.	John F. Hennessy, county clerk, fee.	1 25	
1913.				
Jan.	14.	Natural Carbonic Gas Co., for property taken	130,000 00	
		Natural Carbonic Gas Co., interest.	12,090 00	
		C. S. & C. C. Lester, legal services...	1,124 50	
				$395,993 43
		Balance, February 1, 1913		$464,530 34

CHAPTER 811, LAWS OF 1911.

General Expenses.

1912.				
Feb.	1.	Balance		$131 36
	21.	E. B. Davis, services and expenses, January	$65 00	
		H. V. Smith, services and expenses, January	65 45	
				130 45
		Balance, March 1, 1912		$0 91

Salary of Secretary.

1912.			
Feb. 1.	Balance		$1,500 00
	Balance transferred from Chapter 513, Laws of 1910		500 00
			$2,000 00
Feb. 21.	N. B. Nash, services, January	$166 66	
March 12.	N. B. Nash, services, February	166 67	
April 5.	N. B. Nash, services, March	166 67	
May 1.	N. B. Nash, services, April	166 66	
June 10.	N. B. Nash, services, May	208 33	
July 23.	N. B. Nash, services, June	208 33	
Aug. 28.	I. G. Rouillard, services, July	125 00	
Sept. 16.	I. G. Rouillard, services, August	125 00	
Oct. 17.	I. G. Rouillard, services, September	125 00	
Nov. 13.	I. G. Rouillard, services, October	125 00	
Dec. 10.	I. G. Rouillard, services, November	125 00	
1913.			
Jan. 13.	I. G. Rouillard, services, December	125 00	
Feb. 25.	I. G. Rouillard, services, January	125 00	
			1,958 32
	Balance, March 1, 1913		$41 68

CHAPTER 547, LAWS OF 1912.

Secretary's Salary.

	Appropriation	$2,500 00

CHAPTER 42, LAWS OF 1912.

General Expenses.

1912.			
	Appropriation		$7,995 25
March 29.	Baker & Shevlin, pipe, supplies, and services	$21 77	
	B. Brunner, office supplies	24 50	
	A. L. Churchill, receiver of taxes, water taxes	56 00	
	L. B. Fletcher, services	10 00	
	Freeman & Shea, plumbing	31 27	
	J. H. Gleason, plumbing and special services	93 90	
	J. S. Mott & Son, services and maps	32 29	
	N. Y. Telephone Co., telephone, January, February and March	18 60	
	H. F. Qua, coal	6 75	
	R. S. Rimington, lumber	11 20	
	Saratoga Coal Co., cement and supplies	24 20	

1912.			
March 29.	Saratoga Milling & Grain Co., cement and supplies	$48 54	
	Schallehn & Moloney, blacksmithing	14 22	
	W. P. Tarrant, plumbing	12 25	
	C. J. Cunningham, services and expenses, January and February	125 60	
	F. Edwards, services and expenses, January and February	360 19	
	H. V. Smith, services and expenses, February	58 65	
	Payroll, Geyser and High Rock Parks	144 00	
	Office expenses	18 38	
April 6.	C. J. Cunningham, services and expenses, March	66 75	
	F. Edwards, services and expenses, March	191 07	
	H. V. Smith, services and expenses, March	66 10	
May 10.	B. Brunner, office supplies	19 02	
	Lufkin Rule Co., steel tape	6 98	
	N. Y. Telephone Co., telephone and telegrams	12 65	
	Payroll, Geyser and High Rock Parks	161 00	
	H. F. Qua, coal	3 55	
	W. P. Tarrant, gauge	1 50	
	W. L. Allen, services, April	24 00	
	C. J. Cunningham, services and expenses, April	68 75	
	F. Edwards, services and expenses, April	200 95	
	L. B. Fletcher, services	5 00	
	J. A. Meehan, services and expenses, April	37 65	
	H. V. Smith, services and expenses, April	70 00	
	W. H. Waring, services and expenses, April	39 10	
			$2,086 38
	Balance, June 1, 1912		$5,908 87

CHAPTER 547, LAWS OF 1912.

General Expenses.

Appropriation	$18,000 00
Balance transferred from Chapter 811, Laws of 1911	91
Balance transferred from Chapter 42, Laws of 1912	5,908 87
Balance on hand June 1, 1912	$23,909 78

1912.			
June	10.	L. Betts, drilling	$270 60
		H. Crocker, carpentry	25 86
		Farmers' Hardware Co., supplies	15 27
		J. W. Fitzpatrick, tinsmithing, supplies	182 71
		J. Mangelsdorf, seed bags	14 90
		Payrolls, Geyser and High Rock Parks	692 10
		G. F. Shevlin Mfg. Co., pipe, supplies, labor	25 21
		W. P. Tarrant, hardware	3 29
		G. W. Winship, concrete and cement work	91 24
		C. J. Cunningham, services and expenses, May	66 15
		F. Edwards, services and expenses, May	203 54
		J. A. Meehan, services and expenses, May	53 19
		H. V. Smith, services and expenses, May	65 75
		W. H. Waring, services and expenses, May	54 70
		M. E. Boyle, insurance premium	12 50
		Hartwell & Shackelford, insurance premiums	267 94
		Hathorn & Co., purchase price of equipment	3,763 20
		O. V. Howland, insurance premium	22 50
		W. N. Ingersoll, insurance premium	12 50
		Ingham, White & Co., insurance premiums	74 38
		J. M. Kelly, hotel charges	5 25
		J. D. McNulty, insurance premiums	148 69
		N. B. Nash, travel	56 56
		N. Y. Telephone Co., telephone and telegrams	11 34
		G. F. Peabody, traveling expenses	94 54
		J. Peterson, services and expenses	51 40
		H. B. Settle, photographs	20 25
		J. S. Sheldon, insurance premium	22 50
		B. F. Tracy, traveling expenses	31 35
		Van Voast & Leonard, insurance premiums	37 50
July	23.	Adirondack Electric Power Co., supplies, services	17 15
		J. H. Boyce, wreck buildings	50 00
		B. Brunner, office supplies	6 80

1912.			
July	23.	H. Crocker, carpentry	$24 87
		H. P. Cushing, traveling expenses	32 24
		E. C. Eaton, livery	3 00
		D. Eddy & Sons, supplies	30 35
		J. W. Emery, supplies	5 00
		Farmers' Hardware Co., supplies	17 39
		J. W. Fitzpatrick, plumbing	13 24
		J. H. Gleason, plumbing	65 26
		Hartwell & Shackelford, insurance premium	20 00
		Hathorn & Co., permanent improvements	306 80
		O. V. Howland, insurance premium	22 50
		J. McClair, repair Geyser dam	165 50
		H. E. Merrell Nursery Co., supplies	7 30
		J. S. Mott & Son, services	17 50
		N. B. Nash, travel	16 94
		N. Y. Telephone Co., telephone	7 80
		Payrolls, Geyser and High Rock Parks	1,048 47
		G. F. Peabody, office and traveling expenses	28 48
		J. Peterson, services and expenses	47 12
		Saratoga Coal Co., cement	1 10
		States Livery, teaming	12 00
		G. F. Shevlin Mfg. Co., pipe, supplies, labor	112 36
		W. & T. Smith Co., shrubs	58 00
		W. P. Tarrant, plumbing and supplies	15 54
		E. Ward, repairs Geyser dam	112 50
		G. W. Winship, concrete construction	365 50
		C. J. Cunningham, services and expenses, June	25 90
		F. Edwards, services and expenses, June	202 85
		J. A. Meehan, services and expenses, June	53 20
		H. V. Smith, services and expenses, June	64 90
		W. H. Waring, services and expenses, June	52 50
Aug.	28.	G. W. Ainsworth, special services	25 00
		F. E. Brickner & Co., electrical supplies, services	32 43
		Congress Spring Co., motor, pump, tanks	200 00
		H. Crocker, carpentry, painting, supplies	418 04

1912.		
Aug. 28.	Farmers' Hardware Co., supplies	$65 87
	G. Filford & Son, services and supplies	13 95
	J. W. Fitzpatrick, plumbing and supplies	395 05
	August Giese & Son, two Berkefeld filters	90 00
	F. N. Godfrey, traveling expenses...	76 70
	I. Groff, gravel	19 00
	J. Hourigan, accounting.....	711 93
	Ingham, White & Co., insurance premiums	44 06
	C. S. & C. C. Lester, legal services..	2,803 91
	J. B. Lyon Co., printing and supplies.	46 00
	J. Mangelsdorf, supplies.....	7 25
	N. Y. Telephone Co., telephone....	12 00
	Payrolls, Geyser and High Rock Parks	1,306 42
	G. F. Peabody, office and traveling expenses	17 81
	J. Peterson, services and expenses..	46 06
	H. B. Settle, photographs.....	4 18
	Saratoga Sewer, Water & Street Com., services	10 50
	G. F. Shevlin Mfg. Co., supplies....	7 34
	Stone & Morris, livery.....	43 00
	W. P. Tarrant, plumbing.....	70 40
	B. F. Tracy, traveling expenses.....	90 56
	Worden Hotel, charges	3 00
	F. Edwards, services and expenses, July	204 00
	J. A. Meehan, services and expenses, July	56 00
	H. V. Smith, services and expenses, July	67 35
	W. H. Waring, services and expenses, July	56 00
Sept. 16.	J. Chauvin, blacksmithing.....	4 65
	A. L. Churchill, Receiver of Taxes, water taxes	50 00
	H. Crocker, carpentry.....	152 24
	J. W. Fitzpatrick, plumbing and supplies	50 51
	J. H. Gleason, plumbing and supplies.	84 26
	Hartwell & Shakelford, insurance premiums	32 25
	N. Y. Telephone Co., telephone and telegrams	18 00

1912.		
Sept.	16. Payrolls, Geyser and High Rock Parks	$1,125 09
	Office expenses	123 15
	J. Peterson, services and expenses	46 50
	I. G. Rouillard, travel	11 86
	Saratoga Coal Co., cement	19 80
	G. F. Shevlin Mfg. Co., pipe, labor	18 19
	W. P. Tarrant, plumbing and supplies	78 69
	E. R. Todd, lumber	10 67
	G. W. Winship, concrete construction	84 78
	F. Edwards, services and expenses, August	203 00
	H. V. Smith, services and expenses, August	68 80
	J. A. Meehan, services and expenses, August	58 10
	W. H. Waring, services and expenses, August	58 00
Oct.	17. B. Brunner, office supplies	36 60
	H. Crocker, carpentry, contract construction	438 40
	Farmers' Hardware Co., supplies	5 45
	Gage & Perry, hotel charges	49 55
	J. Mangelsdorf, seed bags	5 00
	Payrolls, Geyser and High Rock Parks	654 19
	J. Peterson, services and expenses	25 28
	G. F. Shevlin Mfg. Co., pipe, labor	12 06
	G. Spalt, tumbler washer	75 00
	Stone & Morris, livery	19 00
	W. P. Tarrant, plumbing, contract construction	858 25
	G. W. Winship, concrete and cement work	52 05
	Worden Hotel, charges	4 80
	E. B. Davis, services and expenses, September	33 70
	F. Edwards, services and expenses, September	202 30
	H. W. Giffin, services and expenses, September	26 00
	J. A. Meehan, services and expenses, September	36 70
	C. K. Seipel, services and expenses, September	33 70
	H. V. Smith, services and expenses, September	43 30
	W. H. Waring, services and expenses, September	32 40

1912.			
Nov.	13.	F. E. Brickner & Co., electrical supplies, services	$33 59
		H. Crocker, carpentry	58 90
		Farmers' Hardware Co., supplies	3 95
		J. W. Fitzpatrick, supplies	5 03
		August Giese & Son, two Berkefeld cylinders	5 00
		Hartwell & Shackelford, insurance premium	20 00
		Hygienic Ice & Refrigerating Co., glass containers	14 45
		P. Leonard, services	8 00
		J. B. Lyon Co., supplies	2 26
		J. Mangelsdorf, seed bags	10 00
		N. Y. Telephone Co., telephone and telegrams	25 06
		Payrolls, Geyser and High Rock Parks	533 97
		Office expenses	18 38
		J. Peterson, services and expenses	29 12
		I. G. Rouillard, travel	14 06
		Saratoga Coal Co., coal and cement	31 50
		G. F. Shevlin Mfg. Co., pipe	5 30
		Stone & Morris, livery	20 00
		Ten Eyck Co., hotel charges	27 64
		West Disinfecting Co., liquid soap and supplies	16 35
		E. B. Davis, services and expenses, October	67 60
		F. Edwards, services and expenses, October	202 71
		C. K. Seipel, services and expenses, October	62 50
		W. H. Waring, services and expenses, October	6 75
Dec.	10.	D. Eddy & Sons, grass seed and other supplies	21 08
		Farmers' Hardware Co., supplies	3 04
		J. H. Gleason, plumbing	10 30
		John McNeary, livery	54 50
		National Express Co., express	11 22
		J. Peterson, services and expenses	12 84
		Saratoga Coal Co., supplies	30 47
		Stone & Morris, livery	16 50
		E. B. Davis, services and expenses, November	62 15
		F. Edwards, services and expenses, November	201 10

1912.			
Dec. 10.	C. K. Seipel, services and expenses, November	$59 50	
	W. H. Waring, services and expenses, November	14 35	
1913.			
Jan. 13.	G. W. Ainsworth, services	2 25	
	B. Brunner, office supplies	12 08	
	Hartwell & Shackelford, insurance premiums	35 81	
	W. M. Ingmire, supplies	5 81	
	N. Y. Telephone Co., telephone	6 50	
	Saratoga Coal Co., supplies	16 38	
	G. F. Shevlin Mfg. Co., pipe	2 45	
	Stone & Morris, livery	3 00	
	E. B. Davis, services and expenses, December	67 30	
	F. Edwards, services and expenses, December	200 95	
	C. K. Seipel, services and expenses, December	67 40	
			$23,450 47
	Balance, February 1, 1913		$459 31

CHAPTER 5, LAWS OF 1913.

General Expenses.

	Appropriation (against receipts of $8,021.61)		$7,500 00
1913.			
Feb. 25.	A. L. Churchill, Receiver of Taxes, water taxes	$68 50	
	Collins & Spencer, plumbing and supplies	101 62	
	H. Crocker, lumber and other supplies	21 96	
	Farmers' Hardware Co., supplies	2 96	
	Hathorn & Co., permanent improvement account	117 26	
	Hathorn & Co., disbursements for free water service	2,871 01	
	J. M. Kelly, hotel charges	3 70	
	E. H. King, disbursements for improvements and supplies as lessee Magnetic Spring Bath House	850 41	
	Fred Menges, supplies	6 32	
	N. Y. Telephone Co., telephone and telegrams	7 12	
	Payrolls, Geyser and High Rock Parks	607 20	

1913.				
Feb.	25.	G. F. Peabody, office and traveling expenses	$61 78	
		H. B. Settle, photographs	46 00	
		W. P. Tarrant, plumbing, contract construction	734 44	
		R. H. Thompson, painting	9 15	
		E. B. Davis, services and expenses, January	70 05	
		F. Edwards, services and expenses, January	202 41	
		C. K. Seipel, services and expenses, January	70 05	
				$5,851 94
		Balance		$1,648 06
		Balance transferred from Chapter 547, Laws of 1912		459 31
		Balance on hand March 1, 1913		$2,107 37

Receipts to March 1, 1913.

1912.			
Feb.	10.	General Carbonic Co., gas put up, January	$246 06
	14.	J. Sadler, rent of dwelling, January	8 00
March	11.	General Carbonic Co., gas put up, February	269 00
	28.	J. Sadler, rent of dwelling, February, March	16 00
May	2.	General Carbonic Co., gas put up, March	293 72
	3.	J. Sadler, rent of dwelling, April	8 00
	31.	J. Sadler, rent of dwelling, May	8 00
June	3.	A. Lavine, old Red Spring bath house	100 00
July	6.	G. Hodges, hay at Lincoln Spring	20 00
	18.	General Carbonic Co., gas put up, April, May	669 96
Aug.	7.	J. Peterson, sale of hay at Geysers	5 00
	12.	A. B. Cole, rent of water and sewer privileges	12 00
	22.	E. Carragan, rent of water and sewer privileges	13 00
	22.	C. I. Penrose, rent of water and sewer privileges	13 00
	27.	L. B. Cole, rent of water and sewer privileges	13 00
Sept.	3.	F. G. Hodges, rent of water and sewer privileges	13 00
	7.	General Carbonic Co., gas put up, June, July	483 02
Oct.	10.	General Carbonic Co., Norwalk compressor	750 00
	29.	General Carbonic Co., balance, gas put up, August, September	85 58
Nov.	1.	C. P. Allen, rent of dwelling, September, October, November	15 00
Dec.	9.	W. C. McQueen, pump barrel and valve	10 00
	18.	A. Lavine, old iron	19 10
	23.	E. A. Walker & Co., belting	22 50

1913.			
Jan.	13.	Natural Carbonic Gas Co., balance due for gas put up, compressor and lathe, with interest..	$4,819 76
	17.	C. P. Allen, rent of dwelling, December, January, February . . .	15 00
	21.	Hinsdill Electric Co., balance on motor.....	93 91
			$8,021 61

Forwarded to Comptroller.

March 5, 1912.....	$254 06
March 30, 1912.....	285 00
June 3, 1912.....	309 72
July 3, 1912.....	100 00
August 5, 1912.....	689 96
September 6, 1912.....	69 00
October 3, 1912.....	483 02
November 12, 1912.....	850 58
January 13, 1913.....	51 60
January 17, 1913.....	4,834 76
February 4, 1913.....	93 91
	$8,021 61

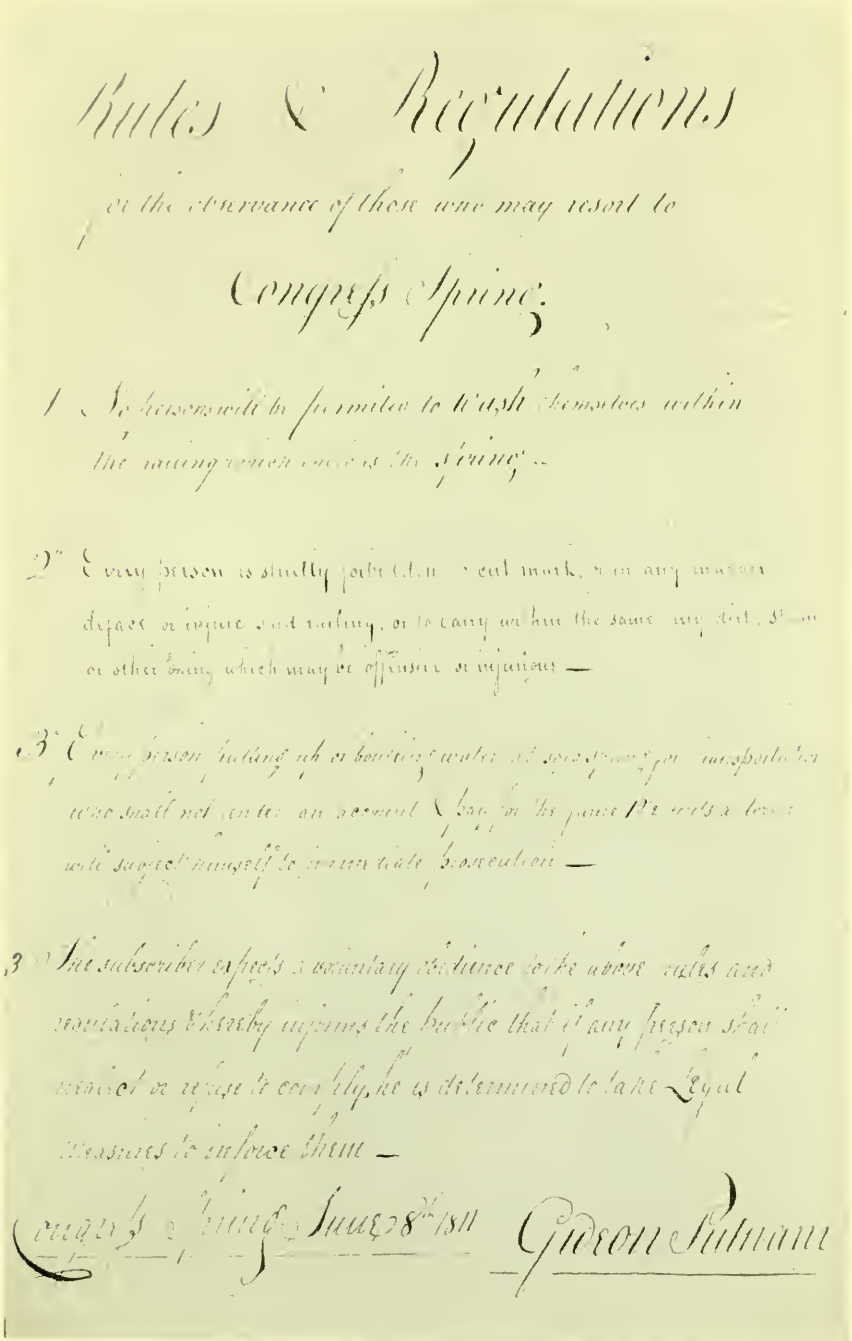
VILLAGE PARK, SARATOGA SPRINGS.

Birdseye view of the proposed Village Park, which will include the present Congress Spring Park and Canfield Park and the Congress Hall property.

General Plan of Proposed Village Park.

Congress Spring Park.

In this Park, acquired by the Village, are located the famous Congress and Columbian Springs.



Rules & Regulations

for the Observance of those who may resort to

Congress Spring.

1st No persons will be permitted to Wash themselves within the railing erected over the Spring —

2nd Every person is strictly prohibited to cut mark, or in any manner deface or injure said railing, or to carry within the same any dirt, Stone or other thing which may be offensive or injurious —

3rd Every person finding fault or bestowing undue abuse upon any Inspector who shall not enter on account & pay for the same, will be severely & severally subject himself to immediate prosecution —

The subscribers express a voluntary obedience to the above rules and regulations & hereby informs the public that if any person shall neglect or refuse to comply, he is determined to take legal measures to enforce them —

Congress Spring June 28th 1811 Gideon Shumate

Historic Manuscript Concerning Congress Spring.

Facsimile of century-old rules and regulations in force in 1811 at the renowned Congress Spring which was discovered in 1792. (Courtesy of Mr. G. R. P. Shackelford.)

CANFIELD PARK.

The beautiful Italian Gardens in Canfield Park, now the property of the Village.

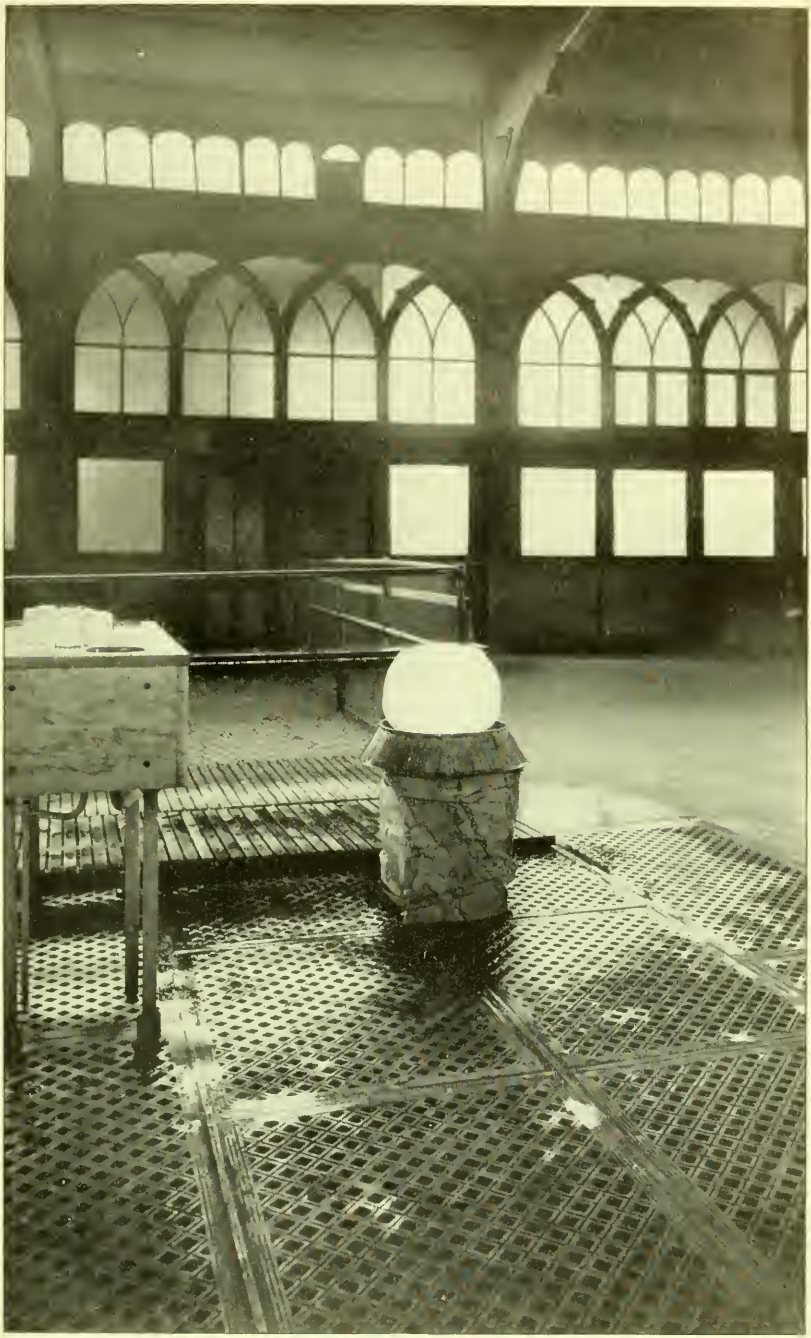
Ball Room of the Casino, Canfield Park.
The Casino is exceptionally well adapted for the purposes of a kursaal.

High Rock Mound.

The tufa formation, generally called the High Rock Cone, through which flowed the original High Rock Spring. This mound is of great historic interest and the site is a valuable monument and ancient landmark.

EMPEROR SPRING.

This spring, not flowing at a point four feet below the floor level in July, 1911, became in April, 1912, a splendid flowing spring. It is a marked illustration of the return of the waters in the Village. This is believed to be the same underground vein that supplied the original High Rock Spring. It is purposed to move the Tufa Mound back to its original site from which it was recklessly taken some fifty years ago, and this water will then be given its outlet there and will be known as the restored High Rock Spring.



HATHORN NO. 1 SPRING.

Located at the Hathorn Building in the center of the Village. View shows arrangements for free service of the water. A drinking pavilion for the service of all the Reservation bottled waters is maintained in this building.

Hathorn No. 3 Spring.
In Geyser Park. A strong cathartic and valuable medicinal water.

COESA SPRING.

Formerly called Carlsbad Spring No. 3. Located in Geyser Park. View shows water flowing in bowl, the regular arrangement for free service.

This view of Coosa Spring shows the bowl removed and the spring spouting naturally.

Another view of Coesa Spring as a spouter. Coesa Pond in the background.

GEYSER SPRING.

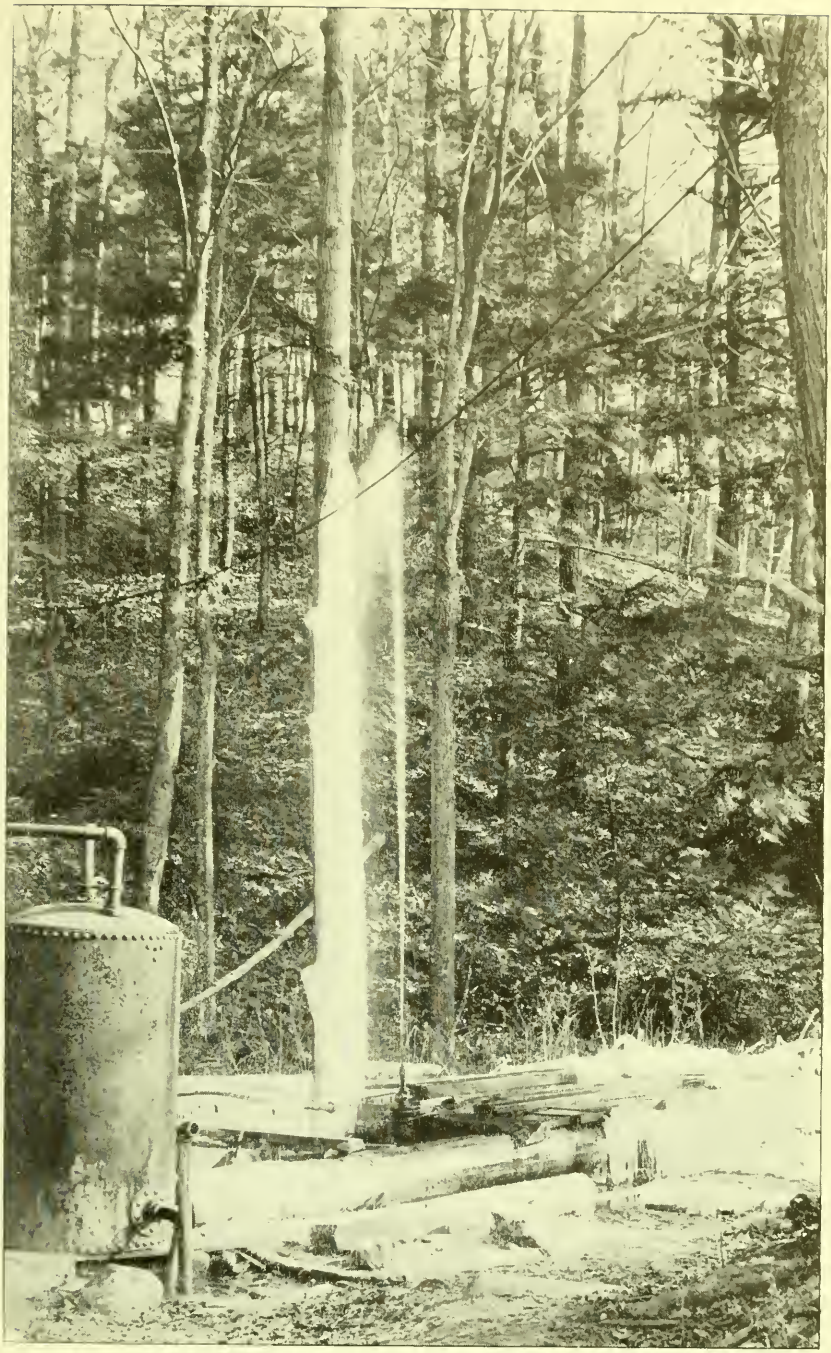
Spring spouting in glass dome five feet high. This spring has spouted continuously since June, 1912, after having failed to flow for many years. The water is very palatable and high in bicarbonate of soda.

ADAMS SPRING.

In Geyser Park. This spring flowed naturally during the pumping and provided nearly one-half of the supply of gas secured by the General Carbonic Company. Its flow of water in December, 1912, amounted to ten gallons per minute. An excellent, palatable water.

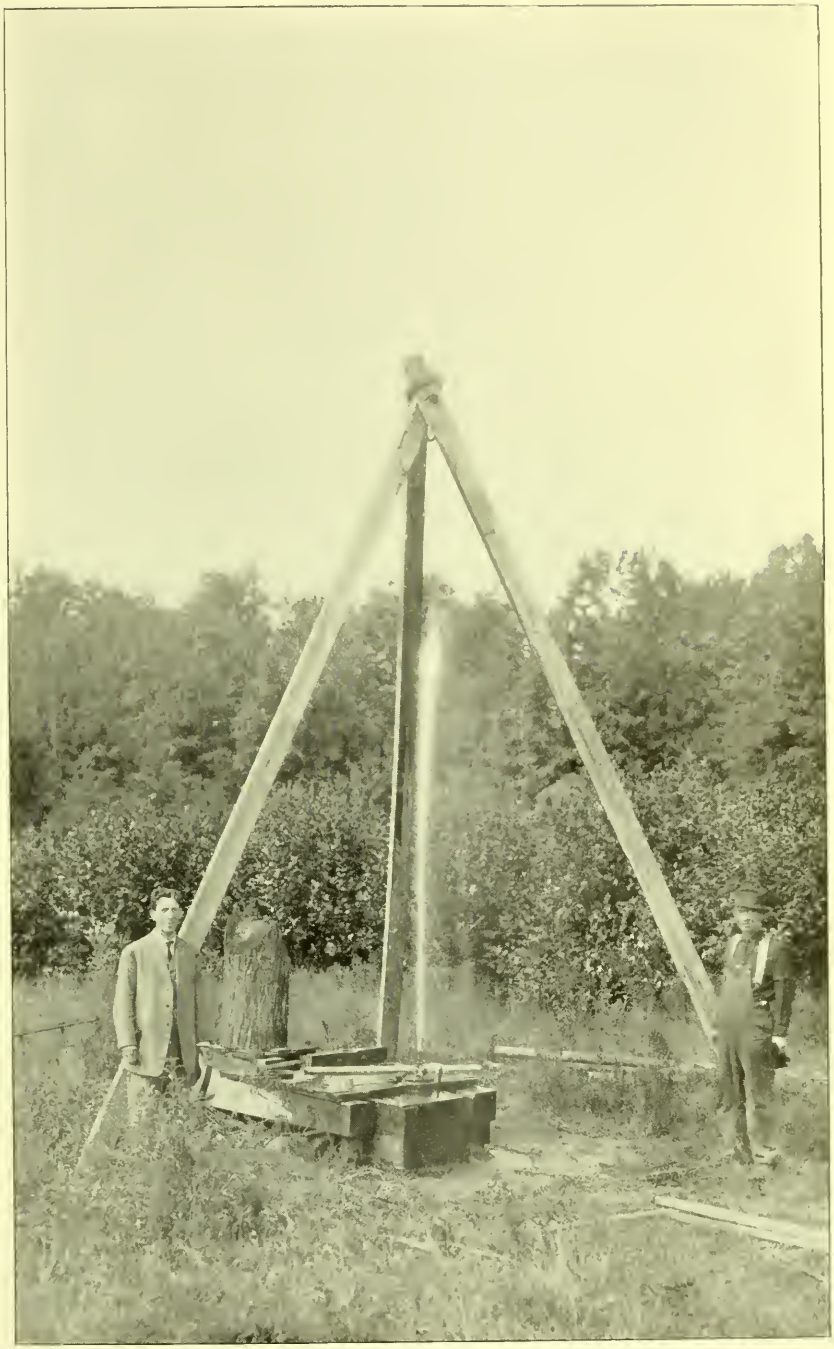
ISLAND SPRING.

In Coesa Valley, Geyser Park. Originally a very productive dry gas well, it became a flowing spring in November, 1911. In December, 1912, it yielded thirteen gallons per minute of excellent mineral water.



PUMP WELL NO. 4 — HATHORN PURCHASE NO. 1.

In Coesa Valley, Geyser Park. Formerly pumped by the General Carbonic Company. It began to flow naturally twenty-four days after the pumping on this tract had been stopped. The unrestricted flow of this spring is over ten gallons per minute.



FLAT WELL NO. 2.

In Coesa Valley, Geyser Park. This became a flowing spring in November, 1911. Since it was tubed in August, 1912, it has spouted at times to a height of nearly forty feet, and has shown a static pressure of forty-two pounds. It is the strongest iron spring of which we have any knowledge.

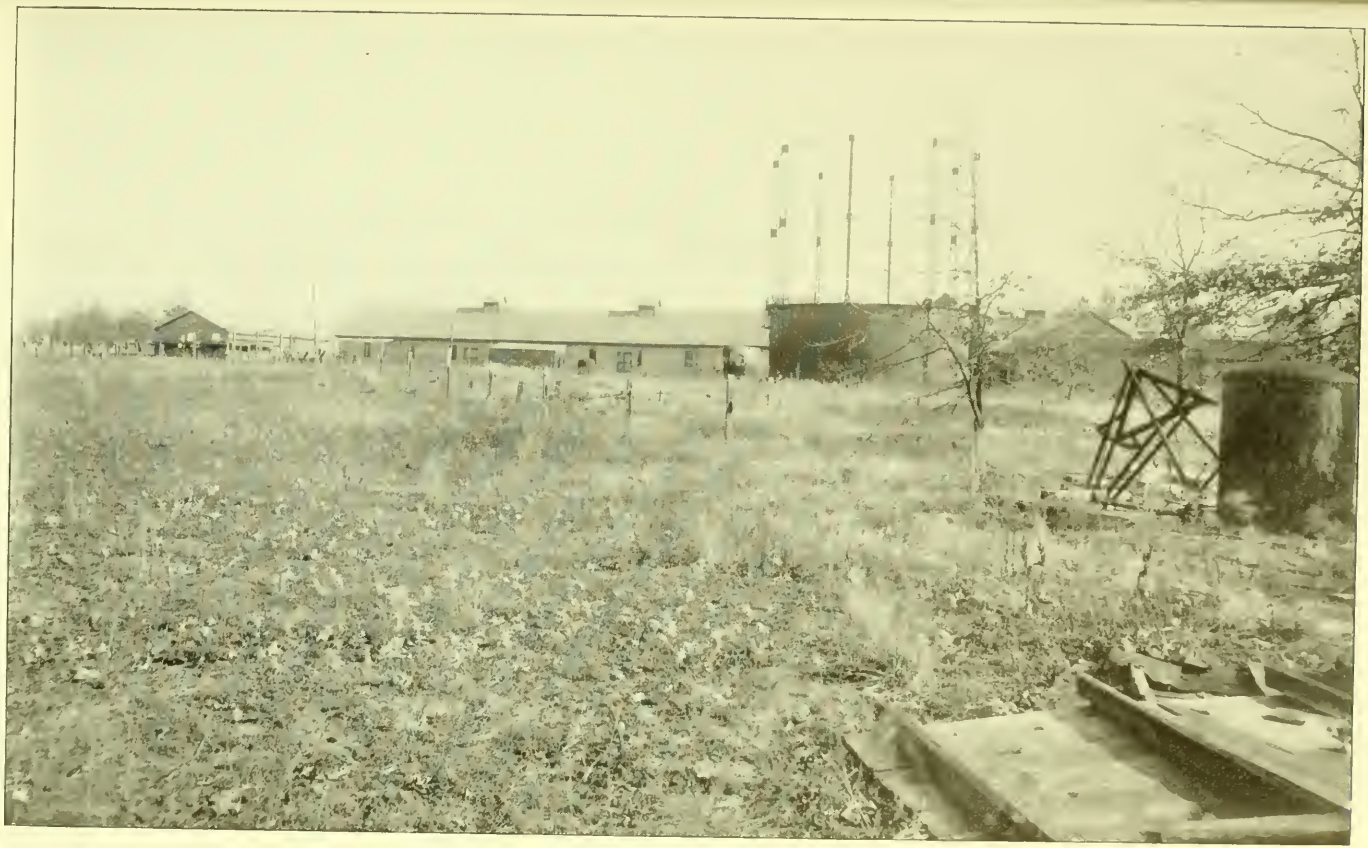
Shonts No. 3 Spring.

In Coesa Valley, Geyser Park. This is a very powerful gas well with a light vein of water which began to flow naturally in the fall of 1912, spouting at times to a height of over thirty-five feet.

Gas Plant of the General Carbonic Company.

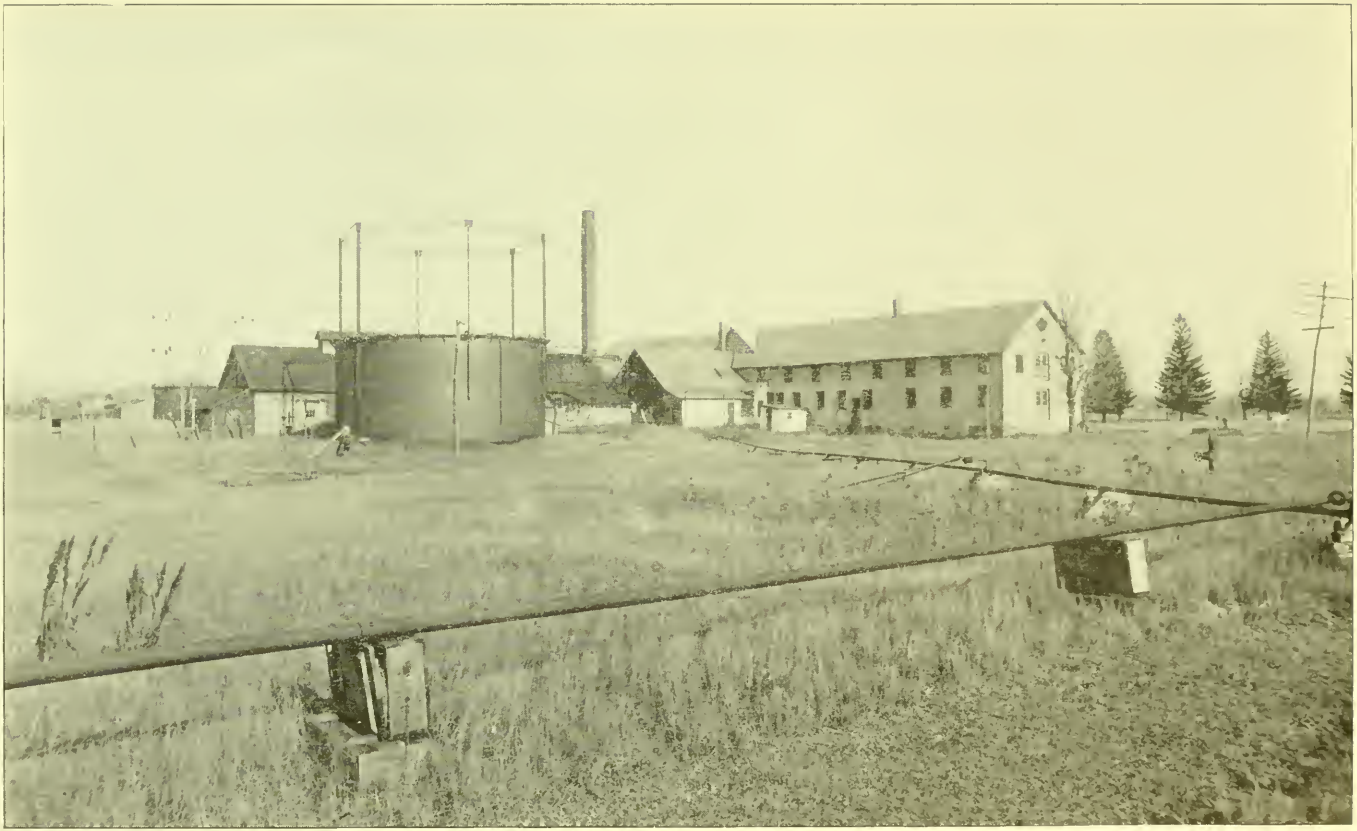
Coosa Valley, looking north. View shows large gasometers, pump rods and pipe-lines used in the process of extracting gas from the mineral water pumped from bored wells, involving a practical waste of 120,000 gallons of mineral water daily.

View looking south. Plant of the Lafayette Gas Company in the background west of the stream. The Island Spring can be seen spouting in the center of the picture.



Gas Plant of the Natural Carbonic Gas Company.

Situated in the Lincoln District on South Broadway. View shows large gasometer, pump-line, and a pump-jack and separator at one of the wells formerly pumped. The operations of this Company exhausted the supply of mineral water to the extent of 230,000 gallons of mineral water per day.



Gas and Bottling Plants of the Lincoln Spring Company.

There are on this property a complete gas-pumping plant, gasometer, pipe-lines, etc. The gasometer in the background is on the Natural Carbonic Gas Company tract which adjoins.

High Rock Park.

View showing unsightly tenements and rubbish heaps occupying the site of the escarpement of the fault when this property was acquired by the State.

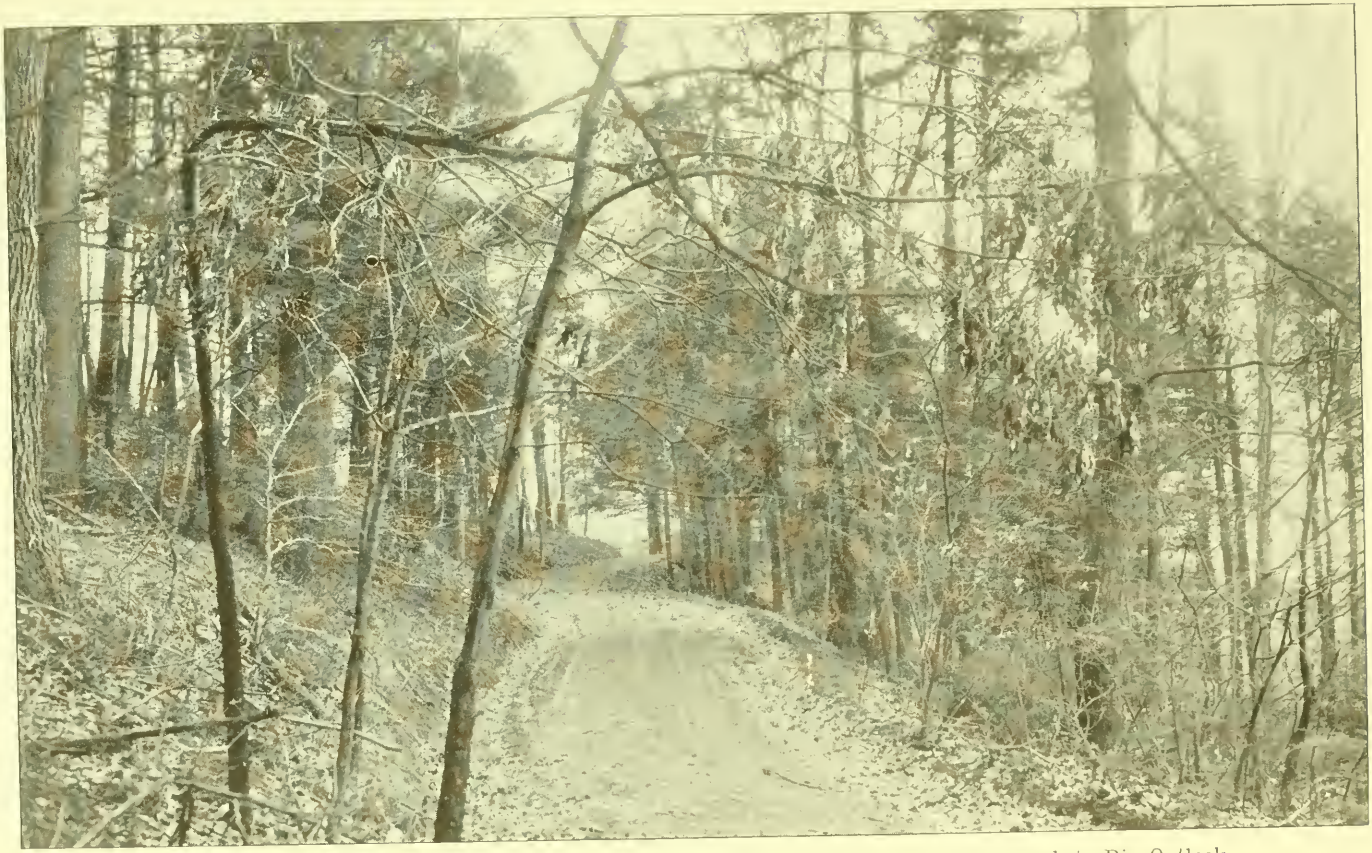
Similar view to the preceding showing further disfigurement of the fault.

View showing the same point after the tenements had been demolished and the rubbish removed.

View looking south, showing site of the High Rock and Emperor Springs. Magnetic Spring Bath House in left background.

GEYSER PARK.

Dix Outlook. Charming roads approach and wind about this bluff leading down to picturesque Coosa Creek, affording delightful carriage drives.



An improved earth road, near one of the spouting springs. This drive is one approach to Dix Outlook.

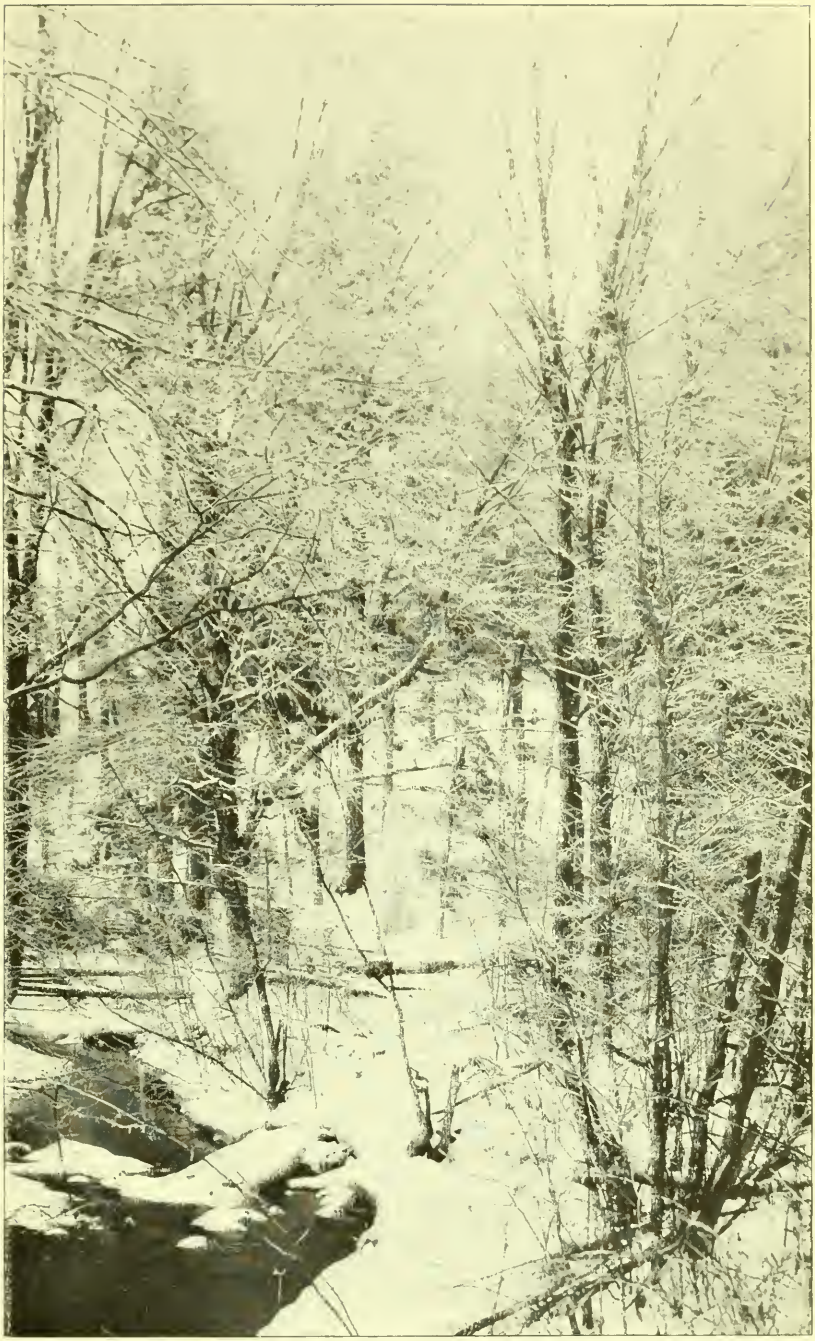
A section of the new road skirting the west bank of Coosa Creek, passing through the flat lands of Geyser Park.

A picturesque trail built beside the winding brook which forms the outlet of Coesa Pond.

Coesa Valley, view looking south from the D. & H. railroad, showing a portion of the Champion tract. The rustic bridges and stairs are admirably adapted to the beginning of park development, being inexpensively but artistically constructed. The beauty of this spot can be enhanced by the removal of the trestle used by the old Hudson Valley line which crosses this stream.

A beautiful spot near the Geyser Spring, showing a further extension of the rustic bridges and trails.

An attractive bit of wintry landscape in Coosa Valley near the Geyser Spring.



Nature's handiwork, a picturesque nook in Geyser Park. The ice column in the center is formed by one of the natural spouting springs.

A winter scene in Geyser Park after a sleet storm.

State Nursery in Geyser Park.

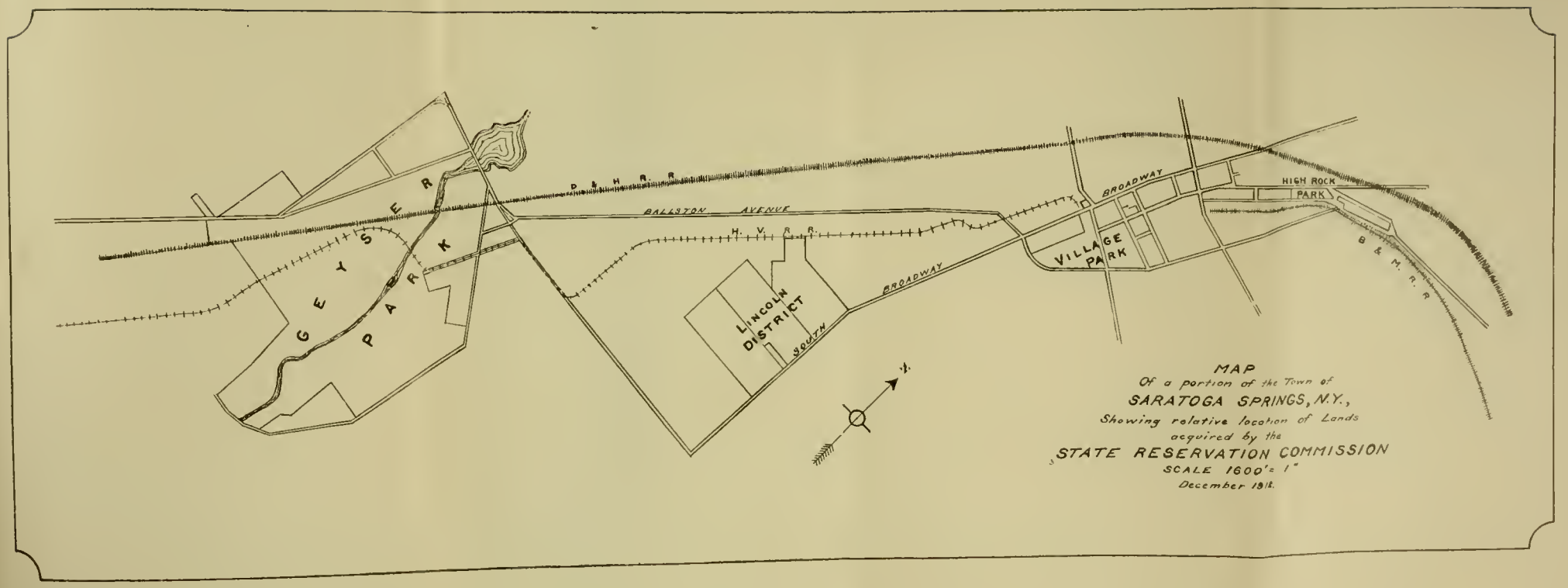
The portion of the Reservation northeast of Coesa Spring is utilized by the Forestry Department of the State Conservation Commission for the raising of conifers, for which this soil is unusually well adapted. About 2,500,000 small trees, ranging from seedlings to three-year-olds, were growing on these ten acres in 1912.

MAGNETIC SPRING BATHS.

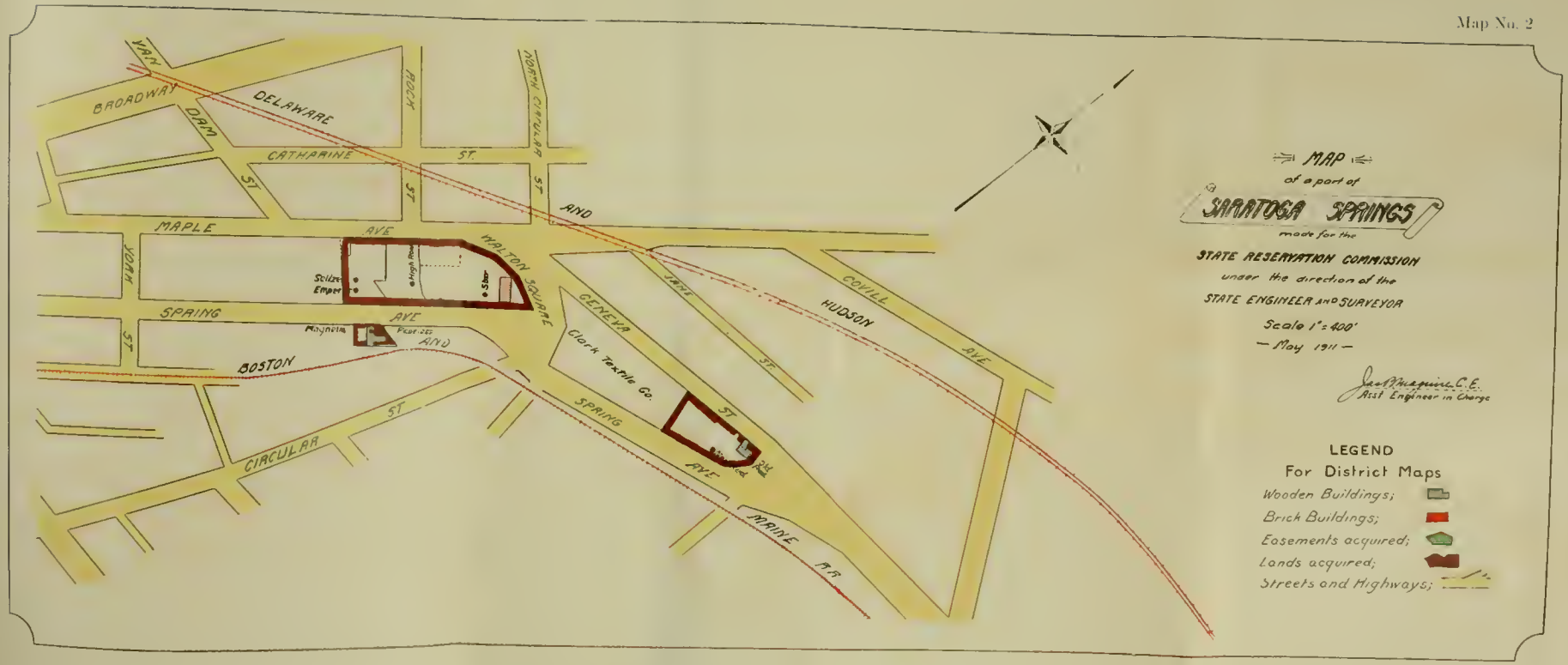
Situated on Spring Avenue in High Rock Park. Mineral water baths are here given, utilizing the surplus waters from the Peerless, Magnetic and Emperor Springs. Over 4,000 baths were given during the season of 1912, the capacity of the bath house being often overtaxed. Increased facilities to meet this growing demand should be provided for the coming season.

SARATOGA SPA BATHS.

Located in the center of the Village. Owned and operated by private enterprise. A great variety of baths are here given. The surplus water from the Hathorn No. 1 Spring is utilized for mineral water baths, being obtained under a lease from the Reservation Commission.



MAP
Of a portion of the Town of
SARATOGA SPRINGS, N.Y.,
Showing relative location of Lands
acquired by the
STATE RESERVATION COMMISSION
SCALE 1600' = 1"
December 1918.



MAP
of a part of
SARATOGA SPRINGS
made for the
STATE RESERVATION COMMISSION
under the direction of the
STATE ENGINEER AND SURVEYOR
Scale 1" = 400'
— May 1911 —

Jas. F. Maguire C.E.
Asst Engineer in Charge

LEGEND
For District Maps

- Wooden Buildings;
- Brick Buildings;
- Easements acquired;
- Lands acquired;
- Streets and Highways;

MAP
of a part of
SARATOGA SPRINGS
made for the
STATE RESERVATION COMMISSION
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Scale 1" = 400'
— May 1911 —
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Asst Engineer in Charge
LEGEND
For District Maps
Wooden Buildings;
Brick Buildings;
Easements acquired;
Lands acquired;
Streets and Highways;
SITE OF CONGRESS HALL
CONGRESS SPRING PARK
acquired by Village
CANFIELD PARK
acquired by Village
Columbian
Congress
Patterson
Putnam
Putnam
Ft. Hill
WASHINGTON ST.
DIVISION ST.
LAKE AVE.
CAROLINE ST.
PHILA ST.
LAFAYETTE ST.
SPRING ST.
HENRY ST.
CONGRESS ST.
EAST CONGRESS ST.
BROADWAY
FEDERAL ST.
SOUTH WILLIAM ST.
WEST HAMILTON ST.
CIRCULAR ST.
SOUTH CLARENDON CT.
WHITNEY PLACE
CIRCULAR ST.

THE
DELAWARE
AND
HUDSON
RR
BALLSTON
AVE
CONFEDERATION
CLARENDON
SARATOGA
SPRINGS
CO
NATURAL CARBONIC GAS CO
LINCOLN SPRING CO
DEYOE LOMMAS
CHIEF NATURAL MINERAL WATER CO
BROADWAY
AVE
MAP
of lands in Town of
SARATOGA SPRINGS
SHOWING RECENT ACQUISITIONS
BY THE
STATE RESERVATION COMMISSION
made under the direction of the
STATE ENGINEER and SURVEYOR
- Scale -
- Dec 1914 -
Asst Engineer in Charge
LEGEND
For District Maps

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